QUALITY
Access to Success

Journal of Management Systems, 6 issues per year

Publisher:
Romanian Society for Quality Assurance, Bucharest, Romania
President: **Dan Grigore Stoichițoiu**

Editorial Board:
Editor-in-Chief: **Tudor-George Mărunțelu** (Romanian Society for Quality Assurance, Bucharest, Romania)
Senior editors:
Florin Gheorghe Filip (Romanian Academy, Bucharest, Romania)
Grigore Belostecinic (Academy of Science of Moldova, Chisinau, Republic of Moldova)
Ioan C. Bacivarov („Politehnica“ University, Bucharest, Romania)
Editor: **Anca Perşoiu** (Romanian Society for Quality Assurance, Bucharest, Romania)

Editorial Advisory Board:
Marin Andreica (Trade Academy Satu Mare, Romania), **Liana Anica-Popa** (Bucharest University of Economic Studies, Romania), **Gabriel Băbuț** (University of Petroşani, Romania), **Dumitru-Alexandru Bodislav** (Bucharest University of Economic Studies, Romania), **Elena Bogan** (University of Bucharest, Romania), **Stelian Brad** (Technical University of Cluj-Napoca, Romania), **Florina Bran** (Bucharest University of Economic Studies, Romania), **Giuseppe Calabro** (Universita degli Studi di Messina, Italy), **Grazia Calabro** (Universita degli Studi di Messina, Italy), **Sudip Chakraborty** (University of Calabria, Italy), **Gian Paolo Cesaretti** (Parthenope University of Naples, Italy), **Lucian-Ionel Cioca** (Lucian Blaga University of Sibiu, Romania), **Andrzej Chochól** (Cracow University of Economics, Poland), **Pietro Columba** (University of Palermo, Italy), **Sorin Cruceru** (Strayer University, Washington, D.C., N.W., USA), **Sameer Mohammed Majed Dandan** (Northern Border University, Saudi Arabia), **Vasile Deac** (Bucharest University of Economic Studies, Romania), **Cosmin Dobrin** (Bucharest University of Economic Studies, Romania), **Enrica Donia** (University of Palermo, Italy), **Nicolae Drăgulănescu** („Politehnica“ University, Bucharest, Romania), **Dalina Dumitrescu** (ASEBUSS Bucharest, Romania), **Numan Muhammet Durakbasa** (Vienna University of Technology, Austria), **Carlo Giannetto** (University of Messina, Italy), **Bogdan Ionescu** (Bucharest University of Economic Studies, Romania), **Florin Ionescu** (Steinbeis University Berlin, Germany), **Maurizio Lanfranchi** (Universita Degli Studi di Messina, Italy), **Lolita Liberatore** (University "G. d'Annunzio" of Chieti-Pescara, Italy), **Bernard Morard** (University of Geneva, Switzerland), **Narcisa Roxana Mosteanu** (American University of Malta, Republic of Malta), **Nicola Mucci** (University of Florence, Italy) **Max M. North** (Coles College of Business, Kennesaw State University, USA), **Carmina S. Nunes** (ESTGA – Aveiro´s University, Portugal), **Marieta Olaru** (Bucharest University of Economic Studies, Romania), **Bogdan Onete** (Bucharest University of Economic Studies, Romania), **Rodica Pamfilie** (Bucharest University of Economic Studies, Romania), **Sabka Pashova** (University of Economics – Varna, Bulgaria), **Iuri Peri** (University of Catania, Italy), **Nenad Peric** (University Union-Nikola Tesla, Serbia), **Ion Popa** (Bucharest University of Economic Studies, Romania), **Doina I. Popescu** (Bucharest University of Economic Studies, Romania), **Sorin Popescu** (Technical University of Cluj-Napoca, Romania), **Carmen Valentina Rădulescu** (Bucharest University of Economic Studies, Romania), **Juozas Ruzevicius** (Vilnius University, Lithuania), **Irina Severin** (University Politehnica of Bucharest, Romania), **Filippo Sgroi** (University of Palermo, Italy), **Roberta Sisto** (Unversity of Foggia, Italy), **Angela Tarabella** (University of Pisa, Italy), **Mihail Aurel Țîțu** (Lucian Blaga University of Sibiu, Romania), **Ion Verboncu** (Bucharest University of Economic Studies, Romania), **Albert Weckenmann** (Friedrich-Alexander University of Erlangen-Nuremberg, Germany), **Dominik Zimon** (Rzeszow University of Technology, Poland)

Indexed in: **WEB OF SCIENCE – ESCI, SCOPUS, EBSCO, PROQUEST** and listed in **CABELL'S Whitelist**

Publisher and Journal address:
Str. Theodor Burada, No. 6, Sector 1, 010215 - Bucharest, Romania

Information:
Tel: 021.313.63.35; 0731.300.120
Fax: 021.313.23.80
E-mail: **tudor.maruntelu@srac.ro**
Website: **www.calitatea.srac.ro**

Print:
S.C. Interbrand Impex S.R.L.

The opinions presented in this publication represent only the opinions of the authors.
Any form of reproduction of any part of this journal, without the written permission of the author or publisher is forbidden.

p-ISSN 1582-2559; e-ISSN 2668-4861; ISSN-L 2668-4861

CONTENTS

Vol. 21, No. 176 - June 2020

Quality Transformation of High Technology Industrial Enterprises Corporative Management in Terms of Transition to Digital Technology

Sergei Sergeevich GOLUBEV[1], Mikhail Yakovlevich VESELOVSKY[2*], Galina Ivanovna ANDRYUSCHENKO[3], Igor Viktorovich BALYNIN[4]

[1]Moscow Polytechnic University, Bolshaya Semenovckaya Street, 38, Moscow, 107023, Russia
[2]Technological University, Gagarin Street, 42, the city of Korolyov, Moscow region, 141070, Russia
[3]Russian Social University, Vilgelm Pick Street, 4, building 1, Moscow, Russia
[4]Financial University under the Government of the Russian Federation, Leningradsky prospect, 49, Moscow, 125993, Russia
[*]Corresponding author: Mikhail Yakovlevich Veselovsky; E-mail: consult46@bk.ru

Abstract

Industrial digital technology development has as a consequence transformation of high technology (high-tech) enterprises corporative management system. While using tools and methods of corporative management are changed considerably corporative management available methods become ineffective, they can't cover digital technology needs.
Changes of corporative management require to make decisions on staffing problems when adopting digital technologies. A board of directors plays an important role in the process of business digital transformation. They should understand what it is conducted for and how the company will provide its successful implementation. Competences in the sphere of digital technologies are of important key aspect not only within the whole enterprise but at the level of a board of directors as well.
Digital technologies influencing business-strategy enterprises, management organizing model, growth of value added as well as the cost of entry in a new business have been considered in the article.
Authors described organizational-economical mechanism of enterprises functioning when adopting digital technologies as well as experience of integrated informational area formation. It allows to increase effectiveness of corporative management with high-tech industrial enterprises.

Keywords: *corporative management; digital technologies; a board of directors; staffing; high-tech industrial enterprises.*

1. Introduction

Introducing digital technologies in work of industrial enterprises has led to the necessity of changes corporative management enterprises digital models, adoption of available organizational structures and company management systems on the basis of new digitization opportunities of enterprises economy and new approaches to run business. Digital technologies always closely interact with each other and provide technological changes of manufacturing process, increase labour productivity, assist to economic growth of enterprises as well as establish new high-performance work vacancies at high-tech industrial enterprises (Kergroach S, 2017).

Being influenced by digital technologies introducing in the corporative management processes existing process of organizing manufacturing is changed considerably, using tools and methods of corporative management are not effective, they can't cover digital technologies needs any more. While demand on new perspective competences is formed, new means of communications in business are appeared, new challenges for staffing policy are changed and business running models are arisen. It is therefore necessary for industrial enterprises to take into consideration changes of corporative management forms and methods in the digital era (Seidl da Fonseca R, 2017).

Old-fashioned approaches in corporative management don't work any more as information is of great importance in industrial enterprises management today, digital management widens opportunities of an industrial enterprise, leads to the growth of share and service segments of the market, assists to new business models arising.

Artificial intelligence, new ways of information processing (text-mining, Big Data), new generation in business could widen considerably opportunities of industrial enterprises to adopt to the external world and changing working environment. When introducing digital technologies, the nature of relationship is changed essentially in the production system, involving tools of business, management of production, personnel and not only new corporative management perfection problems, but opportunities are also arisen (Arntz M., Gregory T., Zierahn U., 2016).

Introducing digital technologies in production is preferable first of all in scientific and high-tech branches of industry which are the most developed in technical and technological equipment of production, and have a highly qualified personnel. Poorly performing branches of industry which have no necessary skill in digitization can render a powerful destructive effect introducing digital technologies (Brynjolfsson E., McAfee A., 2011).

2. Methodology

To estimate influence of introducing digital technologies on the model of high-tech enterprises corporative management

questioning, poll, work group meetings on the problems of estimation influence of digital technologies on the system of corporative management and analysis of opinions were held. While corporative management is considered to be a set of measures directed to the owners protection and ultimately for increase value of a company and investment attraction.

Scientific proceedings of Russian and foreign scientists on the problems of digital technologies introducing at high-tech industrial enterprises, their influence organizational and financial activity of the corporations have been served as the methodological background. Within research work systematic approach, methods of financial-economical, logistic, comparative and factor analysis, method of Delfi and expert panel have been used.

Writing this article the authors used methods of strategic management of high-tech industrial enterprises where digital technologies were introduced which released scientific, high technological and innovative products.

3. Findings

3.1. Influence of digital technology introducing business-strategy enterprises

Digital technologies lead to change of business-strategy and industrial enterprises management model.

Business environment is becoming more flexible, it doesn't prevent internal and external innovations. Timely innovative technologies give new opportunities to form more effective business-models.

Earlier innovations were connected with high expenditures and risks. New patterns opportunities of tests were often difficult because of big costs and complications. Digital technologies allow to perform tests and experiments at such a level which seemed to be inaccessible before.

As a result digital technologies will assist to path from the idea to the introduction into the series quicker, will provide to elaborators opportunities to new item projects in the same informational environment, to evaluate item labour-intensiveness properly and regulate business-processes. It will assist to make defense enterprises activity more effective one.

But at the same time the majority of the private companies couldn't formulate integrated digital strategy and didn't start to forward movement to advanced innovative technologies (Shamsi A., 2017).

Thus, introducing digital technologies is accompanied by changes of defense-industrial sector enterprises management organizing model which contribute to more effective work of industrial enterprises.

3.2. Influence of digital technology introducing transformation of industrial enterprise management organizing model

Business model of enterprise should be considered as somewhat simplified idea of a business company as well as a mechanism of its functioning which offers methods of business administration. Conceptual business-model of an enterprise shows main elements of the value creation blocks, clients and financial model of business administration. Chain of the value creation should be considered as an organized and interconnected combination of processes which are necessary for creation and delivery of necessary and valuable products and services (Kravchenko A.C., 2019).

Digital technologies change management model of modern industrial enterprises. Digital technologies are transformed from business support funds to those of production effectiveness and industrial enterprises management increase. Big data and storage and calculation of cloud-computing technologies, internet of goods open new approaches to take decisions, development of new business-models of intellectual systems and allow to automate fully technological processes (Bacon R., Kojima M., 2011; Nissen V., Lezina T., Saltan A., 2018).

Thus, internet of goods stimulates clever productions in energy. On the basis of internet of goods clever nets allow to produce monitoring of energy transfer and infrastructure state, to find out emergency, to eliminate interruption of power supply as well as stimulate using effective mechanisms of pricing in energy.

Such actively developing new industrial technologies as 3D-printing or additive technologies of layer-specific building of items and their joining digital technologies allows to change situation in the industry through integration of production design and delivery. At present 3D-printing is used for making set of spare parts models, but with broadening printing materials range, increase of surface processing accuracy and quality of ready commodities the role of such technologies will grow. Companies will sell non-physical objects but documentation for its elaboration (9).

Common model of digital transformation and adaptation to realities of digital economy of executive power federal bodies, state corporations, integrated structures and high-tech industrial enterprises can be represented as the most liable to digital transformation characteristics of internal and external environment (figure 1).

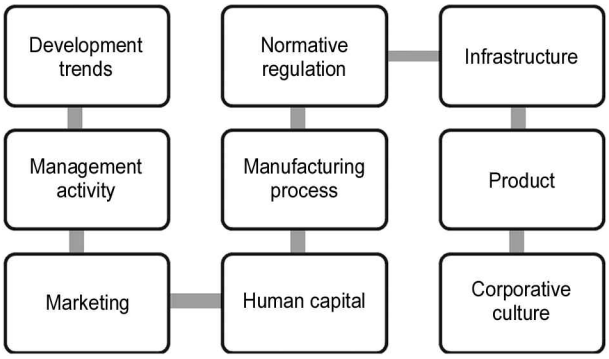


Figure 1. Common model of ideal digital transformation of high tech enterprise corporative management

Thus, it's necessary strategic interpretation of digital technologies development perspectives in their communication with business processes and business models for digital model development of corporation management.

3.3. Influence of digital technologies introducing on the growth of enterprise value added

Economical aspects of digital technologies introducing first of all are connected with considerable increase of value added product and lowering the barrier of entry in new spheres of business.

Economical theory considers value added and gross product as a source of economic growth and result of effective production increase. Due to up-to-date systems of labour payment workers are turned from participants of productive process into those of enterprise income formation (Tarabrin K.A., 2017) (figure 2).

Cardinal changes in the world concerned with the digital technology development and transition to the new technological structure open new opportunities for industrial enterprise development. The main strategy goal of industrial enterprises in terms of digital economy is diversification of economy and increase of high-tech product share including "clever" products.

Markets of "clever" products are developed more than twice quicker than those of traditional ones. In the "clever" market value added products more than a half is formed at the expense of intellectual investment in the technology. Markets of medical equipment, biotechnologies, energy- and resource-efficient equipment, telecommunication equipment, IT, electronics, new

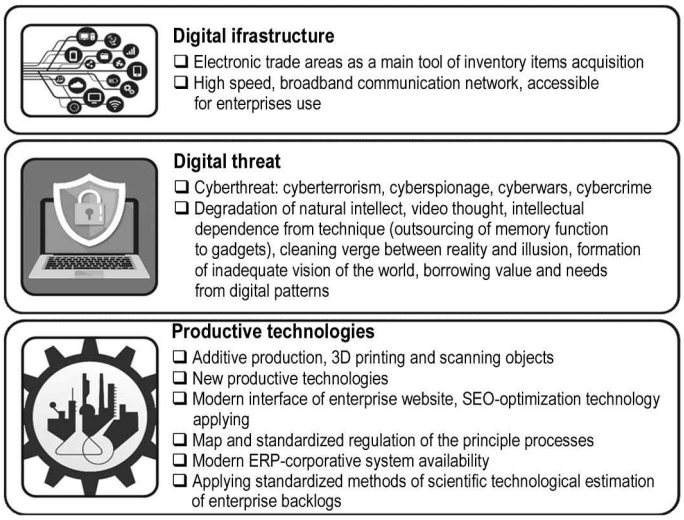


Figure 2. Priority elements of digital transformation which will be introduced at the high tech enterprises of defense-industrial sector

materials, robotics, a system of management. Automated management systems for enterprises, telecommunication networks of new generation, cybersecurity, etc. are considered to be of special perspective (Golubev S.S., Chebotaryov S.S., 2018).

Economical advantages for corporations and business based on digital economy are that they can economize at the expense of resources, operative cooperation with partners, immediate access to an ultimate customer, accelerate mastering a new product, decrease in value of a produced product and multiple time shortening of its output, opportunity of using new modern business models (Golubev S.S. et al., 2018).

When introducing digital technologies at industrial enterprises a lot of problem and risks are arisen too (information custody, data security), but their proper decision, economical analysis of taken decisions of process informatization will allow to raise management level and to achieve considerable economical and social success in the activity of the country industrial enterprises.

3.4. Influence of digital technology introducing on the entry cost in the business

Besides, in terms of digital economy the entry cost in the business is decreased up to 90% (figure 3).

Digital model of economy will allow to implement new kinds of business, a new model of investment attraction in the economy as well as more effective model of management (Worldwide research of Digital IQ, 2017).

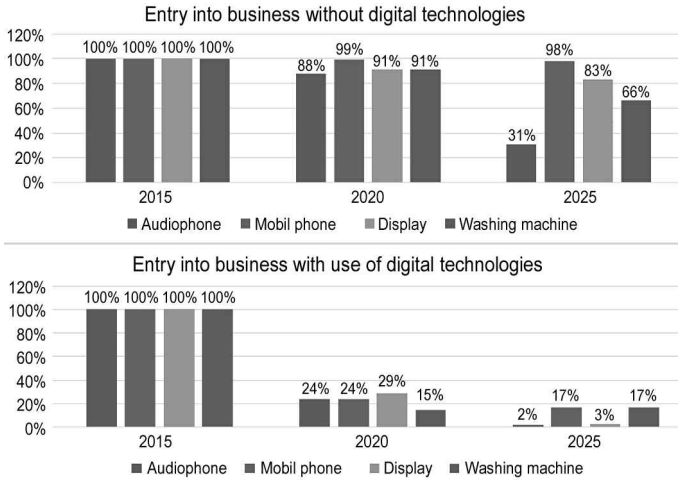


Figure 3. Entry into business without use of digital technologies and with use of digital technologies

3.5. Influence of digital technology introducing on the staffing policy

In according to influence of digital technology introducing on the management process and production new challenges are arisen for changing staffing policy and achieving sustainability, adaptation and effectiveness of labour market.

Employees of the future should have absolutely different competences than average person in business today. What kind of competences will be necessary for generation Z in the future? What will be important in 10-15 years for those who wants to be compatitive and claimed in the labor market? All these problems are reflected in figure 3.2 (Golubev S.S. et al., 2019).

We need specialists of the time who are oriented in the digital environment, who understand how the newest technologies should be applied in their work and simply in their life.

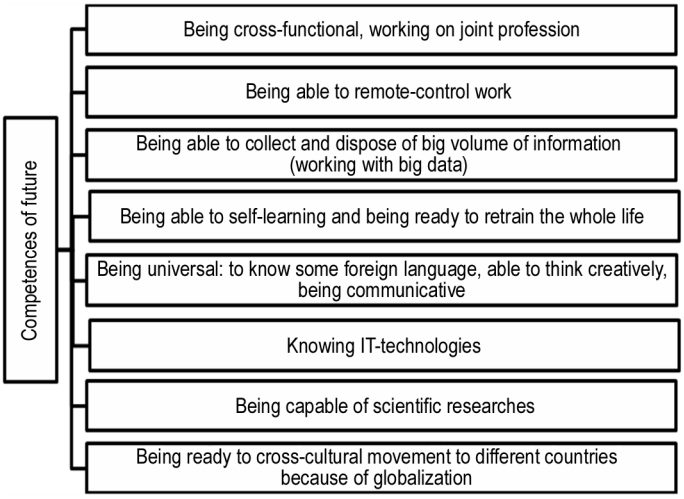


Figure 4. Competences of future

A board of directors plays an important role in the process of business digital transformation. As a rule, digitization of business is an integral component of the company strategy and top management is responsible for it. That's why discussing strategic tasks it's necessary to assign time to envisage consequences of digital technologies introducing (Goos M., Manning A., Salomons A., 2009).

Members of an enterprise board of directors as officials controlling implementation of the strategy play an important role in digital transformation of the company. They should understand what for it is conducted and how the company will provide its successful implementation. Competences in the sphere of digital technologies are considered to be a key aspect within the whole enterprise and at a board of directors level (Chulok A.V., 2017).

Board of directors members should understand what new technologies are the most relevant for the company, how to use them to get income. Besides, a board of directors should decide how the company will run innovative activity: to work within traditional centres of scientific research and development work and corporative incubators or it will be ready to open innovations and methods of design-thought.

Planning digital transformation in the company a board of directors should also estimate its readiness to the digital revolution. Technologies in which companies invest blur industry and contribute to the emergency of new business models and competitors. Current aspect of any branch can be changed essentially only in some years. Are there any specialists in a board of directors in your company with necessary knowledge and experience who can make the company prosperous in future? If there are not any professionals in the field of digital and new technologies, they must be included in a board of directors.

Need to have such specialists with knowledge and experience in the field of digital technologies has been realized

relatively recently. Only some years ago the idea to include an expert in technology in a board of directors didn't cause any enthusiasm of majority of directors. Today governing bodies are aware of such necessity, but only 23% of respondents participating in annual Russian poll, members of a board of directors 2017 held PwC noticed that tasks of technologies introducing are supervised at the board of directors level in their company (Havas A., Schartinger D., Weber M., 2010).

Only effective governing bodies can run digital transformation process successfully. Administration should be ready to innovative activity and cooperation, stimulate their introducing within the whole enterprise. Such process has already been implemented. More than 2/3 (68%) of leaders are responsible of digital technology advancement. Among 2500 largest companies of the world only 19% have a director on digital technologies or a specialist of the same position who is responsible of digital strategy of the company. Leaders of American and international companies are aimed first of all at strengthening innovative potential to get maximum profit from the new perspectives. Digital and technological opportunities as well as human capital were named as the following significant strategic priorities (Mahroum S., Dachs B., Weber M., 2007) .

It's necessary to attract leaders to this work who will be responsible of different vectors of activity in the company including business-strategy, design, programming and human capital. Effort consolidation of professionals who are capable to look at the situation from different points of view at the very beginning stage of digital transformation will assist to widen digitization of business and achieve the assigned task. Together leaders responsible of different vectors of activity in the company can determine objectives concerned with priority trends of business digitization and join efforts to decide tasks on which digital transformation is depended.

Regardless of business digitization management structure in the company it's necessary to organize a regular awareness and actual information about state of affairs. Leaders should discuss with the workers how digital technologies transform business. They should communicate with clients, partners and other interested persons constantly. They should decide how technologies can be used for such a continuous dialogue, in particular video, social network and mobile system (Roshchin S., Solntsev S., Vasilyev D., 2017).

With introducing new technologies which will help to implement corporative strategy companies should invest into training and qualification improvement of the personnel to eliminate deficit of highly qualified staff in the sphere of digital technologies. Directors may be interested in the fact how top-managers go with the times, how process of hiring and development of personnel can be changed. They should also understand how introducing new technologies will influence business processes in the company. A board of directors should participate in such investment. A board should know in details digital transformation of business and can work with new technologies to offer decisions, efficient for the company and implementation of its plans. The following variants of actions are shown which can be used by a member of a board of directors as a baseline.

4. Discussion

4.1. New organizational economic mechanism of industrial enterprise functioning when introducing digital technologies

New organizational economic mechanism of industrial enterprise is formed as a result of digital technologies introducing in the system of industrial enterprise corporative management. Newness of this mechanism consists of system and integrated approach to its formation (figure 5).

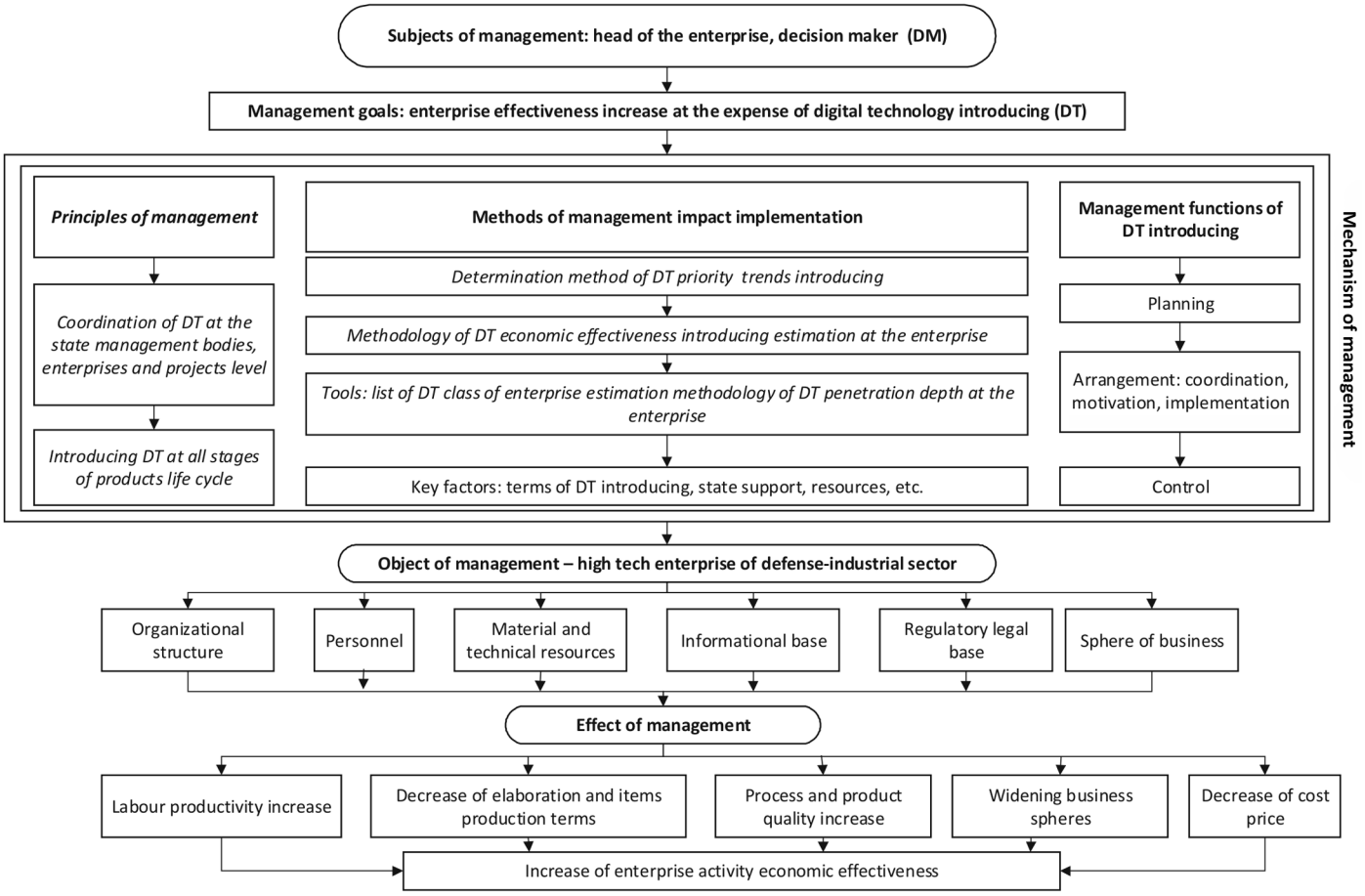


Figure 5. Organizational economic mechanism of corporative management when introducing digital technologies of industrial enterprise

Systemic approach is implemented when digital technologies are introduced into the processes of industrial enterprise management. It supposes coordination of digital technologies introducing into the process at the enterprise, its projects and state bodies management level.

It is determined by the fact that at present automated system of integrated informational area (IIA) of the defense-industrial sector, state informational system of industry (SISI), state automated estimation system of finance-technological risks, originating during state defense order carrying out are established. Digital technologies introducing at the enterprises will provide their communication with state system management.

Integrated informational area

Processes of digital technologies introducing change business-strategy work with data. Today it's necessary to solve a problem of proper management of the data. Earlier data generation was associated with costs. Only structured data could be used. Data of store houses were isolated and considered to be the tool of processes optimization. Ultimately data like any asset work in order to increase the performance of enterprise activity. A head of business working skillfully with the data can receive certain list of steps to achieve appropriate business objectives.

Digital technologies allow implementing continuous data generation. Their main task is to transform data into information. Opportunities of unstructured data interpretation are becoming accessible.

Connection between storages increases data value. The data are considered to be the key intangible asset necessary for cost added establishment.

If we speak about "digital transition" tendencies in the industry it should be implemented to integrate all IT-systems: sensors and tools, machine management, technological operations and enterprise management (operational management, business-planning, logistics). The further development of flexible productive systems is happened: modular assemblage, multiple robots, industrial internet and 3D-technologies. Analytical work is changed by transition from described analytics to expected, and then to directing one. The role of scientific technological development prognoses is increased, constant automated monitoring is implemented, results of which are taken into consideration when elaborating the state programs of development (Markovitch S., Willmott P., 2014).

Integrated model of digital management requires additional investment, but received advantages afford ground for increasing effectiveness of corporative management as well as all business of the company.

It's necessary to notice that development of informational technologies being the main driver of industrial production effectiveness growth, perfection of the state and corporative management due to defense-industrial sector development at the same time causes new safety risk implementation of which in the defense sector can lead to the catastrophic consequences (Wolf W., 2019).

"Civil" informational and telecommunication technologies applying for enterprises of defense-industrial sector functioning support and establishment of armament model of the time, military and special technique (MST) is extremely vulnerable. Such degree of vulnerability is increasing steadily. In according to the Russian Federation Security Council only during 2016 there were more than 50 million cyberattacks to the informational resources of Russia. Comparing with 2015 their number was 3 times increased, 60% was implemented from the other countries (Elmaghraby A.S., Losavio M.M., 2014).

Carrying out research the authors found out that working at the projects there was delay at the industrial enterprises as co-executors didn't get information in time. Establishment of common informational area on certain projects will allow overcoming such a problem when introducing digital technologies.

5. Conclusion

Thus, in terms of introducing digital economy and digital technologies the system of interaction between managers of the enterprises and shareholders (owners) is changed essentially. Company activity effectiveness increase is the foundation on the basis of digital technologies introducing in the productive process and in the system of enterprise governing as well as increase of investment attraction and business value. It is achieved due to business model and enterprise governing change, lowering cost of entry in the new spheres of business in the digital era, the whole set of digital technologies advantages providing growth of enterprise value added.

In terms of introducing digital economy requirements to digital competence of corporative higher level members – a board of directors is very important, as it determines business development strategy and controls its effectiveness. Digital competence of a board of directors members will allow to increase digital technologies introducing effectiveness at the industrial enterprises.

References

[1] Aghion P., Howitt P. (1994). Growth and Unemployment // *The Review of Economic Studies*. Vol. 61. No. 3. pp. 477-494.

[2] Arntz M., Gregory T., Zierahn U. (2016). *The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis*. OECD Social, Employment and Migration Working Paper No. 189. Paris: OECD. Access: http://dx.doi.org/10.1787/5jlz9h56dvq7-en, date of addressing, 26.11.2017.

[3] Bacon R., Kojima M. (2011). *Issues in estimating the employment generated by energy sector activities*. Washington, D.C.: The World Bank. BLS (2015). Employment Projections Program, Industry Employment and Output Projections to 2024. Monthly Labour Review, December 2015. Washington, D.C.: U.S. Bureau of Labour Statistics. Access mode: https://www.bls.gov/opub/mlr/2015/article/industry-employmentand-output-projections-to-2024.htm, date of addressing 24.11.2016.

[4] Brynjolfsson E., McAfee A. (2011). *Race against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity and Irreversibly Transforming Employment and the Economy*. Lexington, MA: Digital Frontier Press.

[5] Elmaghraby A.S., Losavio M.M. (2014). Cyber Security Challenges in Smart Cities: Safety, Security and Privacy // *Journal of Advanced Research*. Vol. 5. Iss. 4. pp. 491-497.

[6] Goos M., Manning A., Salomons A. (2009). Job polarization in Europe // *American Economic Review: Papers & Proceedings*. Vol. 99. No. 2. pp. 58-63. Access: http://dx.doi.org/10.1257/aer.99.2.58, Date of addressing 26.11.2017.

[7] Havas A., Schartinger D., Weber M. (2010). The impact of foresight on innovation policy-making: Recent experiences and future perspectives // *Research Evaluation*. Vol. 19. No. 2. pp. 91-104. DOI: 10.3152/095820210X510133.

[8] Kergroach S. (2017). Industry 4.0: New Challenges and Opportunities for the Labour Market. *Foresight and STI Governance*, vol. 11, no 4, pp. 6-8. DOI: 10.17323/2500-2597. 2017.4.6.8

[9] Mahroum S., Dachs B., Weber M. (2007). Trend spotting the future of information society technology human resources // *International Journal of Foresight and Innovation Policy*. Vol. 3. No. 2. pp. 169-186.

[10] Markovitch S., Willmott P. (2014). *Accelerating the digitization of business processes* / McKinsey, 2014. URL: http://www.mckinsey.com/

business-functions/digital-mckinsey/our-insights/accelerating-the-digitization-of-business-processes (date of addressing 19.09.2017).
[11] Nissen V., Lezina T., Saltan A. (2018). The Role of IT-Management in the Digital Transformation of Russian Companies. *Foresight and STI Governance*, vol. 12, no. 3, pp. 53-61. DOI: 10.17323/2500-2597.2018.3.53.61
[12] Roshchin S., Solntsev S., Vasilyev D. (2017). Recruiting and Job Search Technologies in the Age of Internet. *Foresight and STI Governance*, vol. 11, no. 4, pp. 33-43. DOI: 10.17323/2500-2597.2017.4.33.43
[13] Seidl da Fonseca R. (2017). The Future of Employment: Evaluating the Impact of STI Foresight Exercises. *Foresight and STI Governance*, vol. 11, no. 4, pp. 9-22. DOI: 10.17323/1995-459X.2016.4.9.22
[14] Golubev S.S., Volkov V.I., Shcherbakov A.G., Sekerin V.D., Gorokhova A.E. (2019). Manpower Support for Digital Technology Implementation Processes in Industrial Enterprises // *International Journal of Engineering and Advanced Technology (IJEAT)*, Vol. 8 Issue 3, February 2019, pp. 414-420. (https://www.ijeat.org/wp-content/uploads/papers/v8i3/C5896028319.pdf)
[15] Frey C.B., Osborne M.A. (2013). *The future of employment: How susceptible are jobs to computerisation?* Oxford, UK: University of Oxford.
[16] Shamsi A. (2017). The Relationship between Knowledge Management and Managerial Skills: The Role of Creative Thinking. *Foresight and STI Governance*, vol. 11, no. 4, pp. 44-51. DOI: 10.17323/2500-2597.2017.4.44.51
[17] Wolf W. (2019). Cyber-physical systems // Computer – 2009. – No. 3. – C. 88-89.
[18] Worldwide research of Digital IQ, 201 //PwC, February 2017 https://www.pwc.com/gx/en/industries/industry-4.0.html (Date of addressing 25.06.2018).
[19] Golubev S.S., Chebotaryov S.S. (2018). Informational technologies as key mechanism of sustainable development of defense industrial enterprises under present-day conditions // *Economic strategies*. Vol. 20. No. 3 (153). pp. 68-81.
[20] Golubev S.S., Chebotaryov S.S., Chibinev A., M., Yusupov R.M. (2018). Methodology of scientific technological forecasting of the Russian Federation under present-day conditions. *Creative economy*.
[21] Kravchenko A.S. (2019). Model of company management arrangement. Essays of a specialist on management. URL: http://www.vodaspb.ru/arhive/dr_autor/ model_org_upr_komp/model_org_upr_komp (date of addressing 02.01.2019).
[22] Tarabrin K.A. (2017). From point of IT-decisions to breakthrough – creation of “clever factory” in defense industrial sector. *Connect*, No.4, pp. 3-15.
[23] Chulok A.V. (2017). Stop worrying and begin studying. Mega-trends: look at dynamic portfolio the future competences // *BRICS Business Magazine*. No. 1(17). pp.58-61.

Formation of Marketing Processes Convergent Management

Irina GORYACHEVA [1], Tatyana GORYACHEVA [2], Lyudmila SLAVNETSKOVA [3], Julia BAUROVA [4]

[1] Professor, Department of Economic Security and Innovation Management, Yuri Gagarin Saratov State Technical University, Saratov, Russia; E-mail: rahmaninaia@mail.ru
[2] Corresponding author, Professor, Department of Commerce and Business Processes Engineering, Yuri Gagarin Saratov State Technical University, Saratov, Russia; E-mail: tvgsgtu@rambler.ru
[3] Assistant Professor, Department of Commerce and Business Processes Engineering, Yuri Gagarin Saratov State Technical University, Saratov, Russia; E-mail: lvsla@mail.ru
[4] Assistant Professor, Department of Commerce and Business Processes Engineering, Yuri Gagarin Saratov State Technical University, Saratov, Russia; E-mail: workingday08@mail.ru

Abstract

The aim of the research is the formation of marketing processes convergent management for the implementation of target improving and achieving programs in an unstable environment. Methodical support for variational choice of marketing processes improvement directions is based on the use of game theory methods that allow choosing the most rational solutions for varying degrees of initial information uncertainty. The proposed author's model of marketing processes convergent management ensures: timely elimination of real process inconsistencies and bottlenecks; stability, synchronization, integration of marketing processes; identification of latent opportunities for marketing processes improving; the development of managerial influences capable of smoothing the emerging interests contradictions, and also timely neutralize the effect of disturbance flows and lead to the target attainment. The originality of the research is that the proposed author's model is characterized by the presence of: an integrated diagnostic procedure for identifying key (dominant) environmental factors; procedures for signal monitoring of marketing processes parameters according to selected control and critical points; built-in iterative algorithm for draft versions searching. The value of the research is the application of convergent management, which ensures the development of symbiotic control actions.

Keywords: *marketing processes; maturity processes level; model of convergent management; marketing processes improvement; iterative algorithm of process design; criteria for optimal decision making; unstable business environment.*

1. Introduction

The increase in the degree of interfunctional and interorganizational interactions, changes in the market and competition conditions, the emerging decline in purchasing activity, the complication of production and economic activities, the deformation of management processes require clarification of existing and development of new models and control algorithms that provide timely and adequate management influence on the changes occurring in an unstable environment. The vector of solving these problems lies in the field of variational choice when solving problems of comprehensive optimization of all enterprise processes, including marketing ones, as a necessary condition for improvement processes implementation.

When using the process-oriented approach in management, the process itself becomes a distributed quality regulator of its constituent procedures, oriented to a specific consumer, and identification, formalization, analysis and subsequent improvement of enterprise business processes is an enormous reserve of increasing the efficiency and competitiveness of business as a whole. The main efforts for the majority of enterprises need to be directed to advanced management technologies introduction, backed by appropriate software products to reduce the degree of non-harmony of organizational and managerial development, synchronization of streaming processes, improving the efficiency of process management, the quality of management decisions, reflecting real-time process operations and efficiency, reliability of management information component.

The need for simultaneous provision of marketing processes optimum resulting parameters and the continuity of their improvement determines the symbiotic consideration of these problems and the application of convergent management that creates the necessary structural conditions that ensure the convergence of achieving interaction processes among decision-makers regarding the goals and actions directions, the possibility of processes configuration elements regrouping, their modification and reconfiguration, detection of latent potentials and a synergistic effect obtaining. The importance of balanced marketing processes management in an unstable business environment is evidenced by practical studies that prove that approximately 75% of commercial failures in business organization are due to ineffective marketing processes management and insufficient marketing information, and only less than 25% is due to other reasons.

Procedures for marketing processes improving should focus on specific process optimization potentials, correspond to the enterprise's target settings, adapted to dynamic changes of internal and external nature, and be carried out step-by-step with the involvement of all participants of the affected processes.

The direction of the improvement processes is determined

by the identified problem areas and the established priorities for their selection, taking into account the complexity of cause-effect relationships and adequacy to situational conditions. The spectral sequence of steps to implement solutions in the field of marketing processes managing should take into account the impact of each step on the ultimate effectiveness of the management process to achieve a balance between the enterprise processes maturity levels in an unstable environment. Consequently, the question is not whether it is necessary to improve its activities and processes, but, first and foremost, is how quickly and scale it needs to be done, which determines the relevance of the issue under consideration.

2. A glance at the existing literature

The dynamic development of information technologies, the growth of technological achievements, the transformation processes in the economy, the weak predictability and instability of the business environment are accompanied by the constant search for new ways that enhance the ability of business processes, including marketing ones, to continuously and consistently adapt to ongoing changes in external and internal character and require the decision of models development and introduction problems and algorithms of management processes optimization.

The solution vector of the problem lies in the field of resolving the contradictions between the limited resources of the enterprise and the growing needs of clients in an unstable environment, which is associated with the need to develop and implement models for marketing processes managing and determines the dominance of the marketing management method. The attention is focused on marketing processes orientation in accordance with the needs of consumers who have significant potential to ensure the adaptation of the value proposition to rapidly changing consumer preferences, balance marketing processes profiles and formulate programs for their improvement (Kaluzhsky, 2016, Viio and Grönroos, 2016).

A number of authors believe that solving the tasks of increasing business efficiency, including marketing processes, lies in the field of network structures forming, increasing the degree of interorganizational interactions and developing forms of marketing and logistics processes integration, which ensures organizational alignment of processes, effective value creation, implementation of new market opportunities and aligning the organization with its business environment (Goeke et al., 2010; Hamel, 2012; Sergeeva, 2016; Wagner and Eggert, 2016; Ziggers and Henseler, 2016).

Considerable attention is paid to the problems of integrated communications introduction and application, the latest advertising technologies, the methodology of brand formation, consumer value and its perception by consumers (Voges, 2014, Bell and Buchner, 2017, Vesanen and Raulas, 2006), as in most business performance is largely determined by the extent to which the aggregate of marketing communications is integrated among themselves.

The variety of models developed provides solutions to problems of evaluation and selection of effective marketing communication tools, taking into account the target orientation to the segments of identification consumption, forming an individualized offer based on the criterial choice of the consumer (Kocas, Pauwels and Bohlmann, 2017) and orienting on a gradual transition of information component (consumer's awareness about goods and services) before deciding on the acquisition (Kocas, Pauwels and Bohlmann, 2017). Particular attention is paid to dynamic models of digital advertising, providing vector performance of advertising process information component, concentrating on selected segments, the perceived value of the product or service and the prevailing identified model of customer consumption (Bruce, Murthi and Rao, 2017); (Larivière, Keiningham, Aksoy, Yalçin, Morgeson III and Mithas, 2016; Tretyak, 2009).

In modern conditions of managing management process information support is crucial for making decisions in the field of marketing strategies developing and selecting areas for marketing processes improving, which requires an assessment of the quantitative and qualitative characteristics of both processes and implemented strategies, as well as control systems formation and control process models development. When organizing theoretical and analytical and applied research in the field of marketing processes improving and adjusting strategies, deep-seated interviews, statistical methods of analysis of interrelations and interpretative approaches in qualitative research are of primary importance (Bashirov, 2015, Mone, Pop and Racolta-Paina, 2016); (Wilson and Sherrell, 2013) (Uryas'eva and Nikolaeva, 2016).

Recently, the concept of processes maturity is actively developing and the scope of its application is expanding. Within the framework of this concept, five levels of process maturity are distinguished (1st level – initial process, 2nd level – repeatable process, 3rd level – specific process, 4th level – controlled process, 5th level – optimized process) and their characteristics are given depending on the degree of certainty, controllability and efficiency. Each level of process maturity has a detailed set of goals aimed at increasing the effectiveness and continuous improvement of the process. A relationship is revealed between the levels of process maturity and the process potential, which increases with increasing maturity level; formalized a conceptual model of maturity with a grouping of key processes pointing to areas of efforts concentration to improve the process (Ilysheva, 2009; Paul et al., 2002; Zaguskin, 2016).

Most researchers agree that the achievement of each maturity structure level is characterized by the introduction of various components that increase its stability and effectiveness, ie, disclose the main changes in processes initiated at each level. The maturity level of the process reflects the potential for increasing efficiency and at the same time the consistency with which the enterprise uses this process.

In general, it should be noted that the accumulated extensive theoretical and methodological basis in the field of marketing management, marketing processes modeling, information support for the processes of marketing decisions making, etc. has not lost its scientific and practical value, but it needs modern correction when solving the problems of marketing processes managing in an unstable environment. The ongoing dynamic changes in the business environment and the transformation processes in management require the search for new forms, methods, and management models that, by means of a multicomponent symbiosis of control actions, can ensure the increase in marketing processes effectiveness and the implementation of effective processes for their improvement with increasing degree of disturbance flow action.

3. Theoretical analysis

In an unstable business environment, in order to maintain a sustainable competitiveness, enterprises need to respond quickly to occured changes that is provided by the identification procedure of problem areas, the implementation of measures to eliminate the impact of the disturbance flow and the transparency of all enterprise processes. It should be noted that according to the estimates of "Logic BPM" and "TAdviser" specialists, at the majority of Russian enterprises key business processes are regulated and meet the targets of 35% of those surveyed in 2016, only 6% of enterprises perform continuous monitoring and improvement of processes, detailed and controlled regulations for business processes are installed only in 11% of enterprises from the respondents. These circumstances indicate a weak development of the process-oriented approach in Russia, due to the prevalence of a functional one that does not provide a clear regulation of certain functions that leads to a decrease in products and services quality, an increase in the

level of overall costs, and a decrease in the profitability of the enterprise.

Obviously, in the Russian Federation there are a number of problems in marketing processes management:

- the lack of marketing processes balance leads to different process categories maturity levels that generally reduces their quality and affects the implementation of competitive advantages and generally reduces the competitiveness of a business entity;
- a low controllability level of a marketing processes part can lead to the emergence of process unconformities in the uncontrolled stages in conditions of high process risks probability;
- the contradictions arising in the course of the choice between reducing costs by marketing processes optimizing and the advisability of more productive customers' growing needs meeting;
- the reduction of management information component quality characteristics (volume, accuracy, timeliness of obtaining information), leading to a decrease in manageability and loss of marketing processes efficiency;
- the growth of information flows accuracy degree increases the effectiveness of marketing processes managing and simultaneously leads to increased costs and a decrease in management system efficiency;
- the lag of information flows between hierarchical levels leads to a deficit of the information component that reduces the quality of managerial decisions and the degree of coordinated communications for managing the entire set of marketing processes;
- temporary shifts in the organization of transient processes lead to uncompensated deviations from the planned parameters and the established development vector in accordance with the objectives that leads to an increase in the degree of their partial achievement probability;
- the lack of effective procedures for forecasting and identifying vulnerabilities of marketing processes, which creates the prerequisites for increasing the likelihood of marketing risks and reduce the quality of management decisions;
- functional orientation of organizational and management documentation reduces the quality of processes, the degree of their control and does not allow timely detection of vulnerabilities in processes network.

Consequently, there is a need for radical changes, intensification of internal processes, a complex change in the basic subsystems and the principles of work with the subsequent development of a model for marketing processes managing that involves an economic balance of the enterprise's marketing activities, efficiency, the choice of effective management impacts and tools for improving processes to achieve goals in an unstable environment.

The uneven development of marketing technologies within individual enterprises, the lack of investment in marketing infrastructure, the increase in the intensity and complexity of streaming processes determine the need to develop and implement a model for marketing processes managing in enterprises practical activity, taking into account the effect of the disturbance flow.

The diagram of the model of marketing processes convergent management presented in Figure 1 assumes the formation of an information base with the inclusion of a factors classifier (dominant factors) that influence the resulting parameters of marketing processes and targets with detailed management tasks integrated with the overall strategy of the enterprise. For the formation of control actions and ensuring the planned result parameters of all processes, it is necessary to identify marketing processes with detailed links and interactions between different configuration elements. So within the framework of this research the following key processes of marketing activity are distinguished: market analysis (marketing research of the market); interaction with consumers; marketing strategy; sales management; analysis of customer satisfaction; claims management. A clear understanding of marketing processes structure will allow us to determine not only the key, but also the critical processes, and also ensure the improvement of control actions quality.

It should be noted that the configuration of marketing processes depends on the nature and complexity of the elements, their interactions, industry specifics, properties of micro- and macroenvironment, the types and parameters of the main and associated flows, selected technologies, etc.

An obligatory condition for the development of timely control actions is the availability of a system for assessing the status of marketing processes and identifying the maturity level of each process that is a signaling tool for the improvement process to implement adjustments and changes in major inconsistencies in the actual course of the process. Evaluation of the maturity level allows us to determine the key measures necessary for the consistent optimization and adaptation of processes while maintaining the optimal combination of its cost and quality.

The authors believe that perfection of marketing processes should be carried out taking into account the market demand for the essence of changes and their quality, and the process of improvement consists of the following phases (Figure 1): processes improvement organization; documentation and tools selection; improvement opportunities analysis; planning; implementation.

The implementation of the iterative algorithm for marketing processes design begins with the search for draft versions that meet the established requirements on the available information base of analog solutions. If a solution is not found, then in the synthesis block a certain number of permissible priority process variants that meet the specified organizational and technical constraints is formed. Process modeling is carried out to develop a sequence of actions, a description of the mechanism for parameters monitoring and controlling of the input and output processes, the process change from the point of view of its optimization with respect to time and resource parameters that allows testing alternative versions and predicting the behavior of the process in a particular organizational and economic environment. The obtained modeling results are compared with the specified technical conditions, the causes and possible consequences of deviations are identified. In the complex version evaluation, the calculation of its effectiveness is performed taking into account the degree of influence of the disturbance flow and the significance of the process for the client. The effectiveness of the version will largely depend on process management system effectiveness, so when making a decision it is also advisable to analyze and select the operational management parameters. The parameters of the management process should provide timely control action to eliminate the identified discrepancies and the negative effect of the disturbance flow based on the built-in signaling system.

Despite the variety of marketing processes, the availability of common characteristics allows them to solve the problem of selecting management parameters from unified methodological positions. In particular, for any marketing process, a management algorithm is required that selects the values of its operation parameters. These parameters form a management action aimed at marketing processes regulating. The basis for an integrated marketing system design in an enterprise is the construction and implementation of algorithms that would optimize the selected quality control indicator. The solution of this problem becomes possible if the dependence degree of chosen management criterion and the algorithm is known.

At the same time, the main function of organizational and technological marketing processes management is the organization of process components synchronization and their flows within the framework of marketing activities, i.e. organization of internal flow interactions. The authors believe that the time limits for managerial decisions making at a particular level determine the appropriateness of situational management methods using.

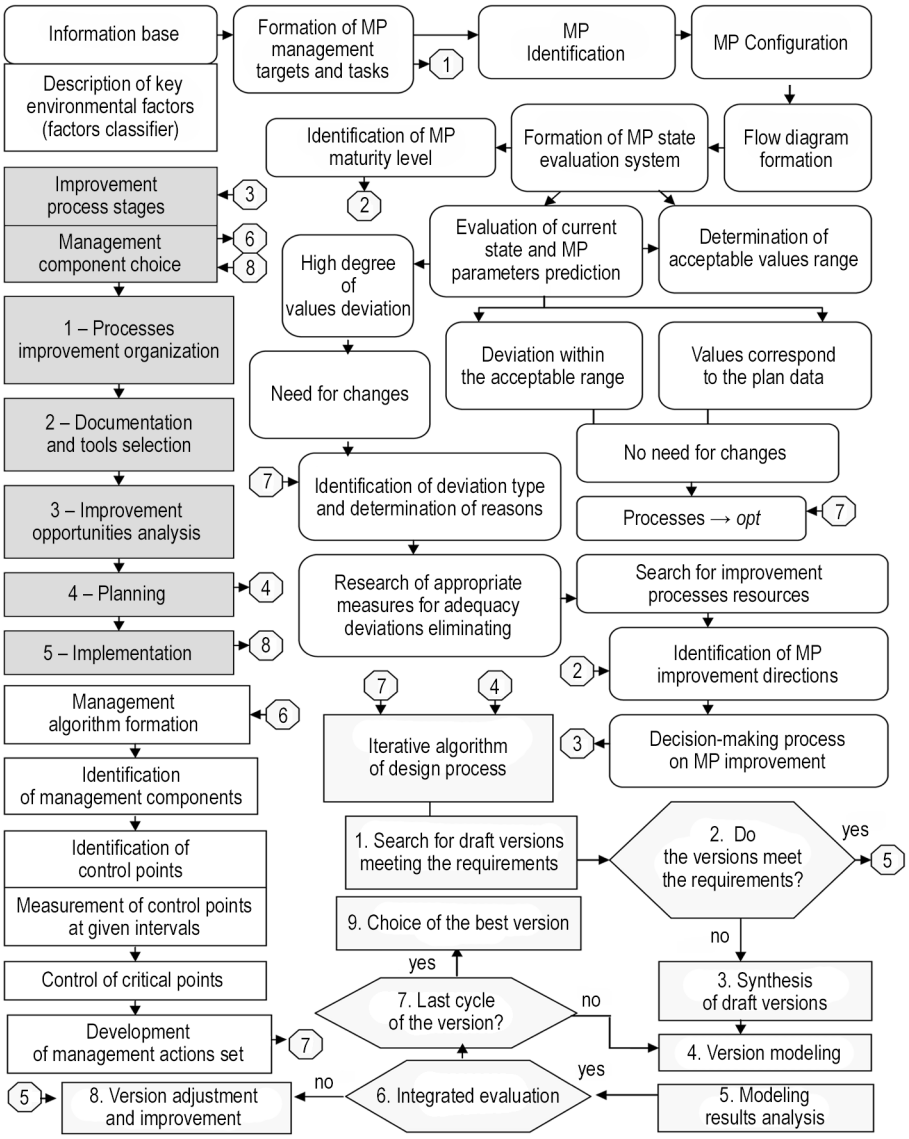


Figure 1. Diagram of the model of marketing processes (MP) convergent management

In this case, the choice of a management action is carried out by selecting from the set of available solutions corresponding to a limited number of situations. Management in this case is reduced to identifying the situation and making decisions in accordance with the management action determined for it. In its turn economic and organizational management ensures the implementation of plan programs in accordance with the marketing strategy, and a significant time reserve for decision-making at this level allows the use of simulation based on random factors that affect marketing processes.

If there are discrepancies between the resulting process parameters, the established criteria and the range of plan values, an adjustment is made to eliminate inconsistencies that is performed on the selected control points with the establishment of their interval measurement for internal correction of the intermediate state of the process. Identification of control points demands changing the processes in order to eliminate major inconsistencies in the actual course of the process. Then control signals are generated to eliminate deviations and bottlenecks affecting the modeling process. To reduce the disturbance flow influence degree occurring during the operation, critical points are monitored.

Thus, the use of the proposed author model of marketing processes convergent management will ensure:

- a step-by-step trajectory of transition from chaotic processes to mature, ordered;
- elimination of non-harmonious development in terms of maturity concept and the introduction of more advanced technologies for the processes implementation;
- identification of latent opportunities for marketing processes improving for their long term implementation and studied processes latent links establishing that will ensure the growth of the improvement potential and a smooth transition to the next level of maturity;
- development of managerial influences that can timely neutralize the effect of disturbance flows and lead to a focused, useful effect with constant marketing processes and system factors monitoring.

Therefore, in an unstable environment, it is not enough just to react to its rapid changes, you need to be prepared for future changes to make more effective use of competitive and resource opportunities.

4. Empirical analysis

The main task of management in an unstable environment is to select and implement management actions that, under conditions of a diverse flow of external and internal disturbances, can ensure the reliability, flexibility, and effectiveness of all processes. The most effective way to solve such problems is to use the methods of game theory. In this theory, a number of criteria are recommended, which allow choosing the most rational solutions for varying degrees of uncertainty in the initial

information. The characteristics of the criteria influencing management decisions are presented in Table 1. These criteria evaluate various aspects of decision making and are aimed at the implementation of the decision that most satisfies the real conditions (Demidova, et al., 2012).

An important component of choosing solutions process in an unstable business environment is the existence of an acceptable solutions set providing the solution corresponding the best indicator's value chosen as a criterion. At the same time, the effectiveness of each solution depends on the real combination of possible conditions, and each combination has its own optimal solution.

Thus, you can choose the improvement direction in compliance with different criteria depending on the goal. Priority in the target setting is given to marketing processes flow effectiveness increasing taking into account the adaptation for a specific consumer. The complexity of the variational choice in managerial decisions making regarding the directions for marketing processes improving is explained by a number of reasons of external and internal nature and is connected with the insufficient information component of the management process (i.e., decision-making under conditions of probabilistic uncertainty). Due to limited resources, the identification of marketing processes improvement directions, according to the author's point of view, should be based on the choice of the best alternative, corresponding target for a focused useful result obtaining and the established order of versions preferences. When improvement programs implementing, the authors consider it necessary to prioritize marketing processes for the enterprise, using as its evaluation the following criteria: the degree of process influence on profits and the formation of key success factors; the level of process current quality; periodicity of the process; the importance of processes for customers; timing and process effectiveness.

Criterion	Characteristic	Mathematical formula
Wald's criterion (maximin)	The choice is made on the basis of maximizing the minimum profit under the worst conditions (environmental conditions) or minimizing the maximum losses.	$W = \max_i \min_j v_{ij}$, where v_{ij} – the value of the strategy result according to the conditional winnings matrix from the corresponding row i and column j.
Laplace criterion	The solution variant that gives the largest expected gain is chosen. To make a decision for each variant, calculate the average arithmetic value of the win and select the maximum value that will correspond to the optimal strategy.	$L = \max_i [1/n \sum v_{ij}]$, where $q_i = 1/n$ – the probability, n – the possible number of environment conditions
Savage criterion (minimax)	It presupposes the choice of an option that under adverse environmental conditions will provide a minimum risk.	$S = \min_j \max_i r_{ij}$ where r_{ij} – risk
Hurwitz criterion	For each possible solution, find the smallest and largest winnings for each strategy, multiply them by respectively λ and (1 - λ), then choose the solution for which such an average winning is maximum.	$H = \max_i [\lambda \min_j v_{ij} + (1 - \lambda) \max_j v_{ij}]$, where λ is an indicator of pessimism, $\lambda \in [0, 1]$: the closer to 1 it is selected, the more pessimism it shows in relation to the situation in question.
Modified Savage criterion	As a result, in addition to the classical concept of "regret' it is also suggested to measure it also by the magnitude of the difference between the level of claims and the current result. Therefore, it is quite possible that "regrets" can be obtained with both a plus sign and a minus sign. In other words, negative regret means "significant success", expressed by means of the obtained result excess over the selected level of claims.	$S = \min_j \max_i r_{ij}$ In this case, a restriction is added, in which $1/n \sum r(Q,3) \leq z_{claim}$, where z_{claim} – the level of claims, set according to the arithmetic mean of the possible regrets for each of the alternatives.
Modified Hurwitz criterion	In evaluating each alternative, in addition to the extreme values of the outcome, intermediate results also appear.	$H = \max_i [\lambda \min_j v_{ij} + (1 - \lambda) \max_j v_{ij}]$ A restriction is added, in which $1/n \sum y(Q,3) \geq y_{claim}$, where y_{claim} – the level of claims, set according to the arithmetic mean of the possible outcomes for each of the alternatives.

Table 1. Criteria and their characteristics

We will evaluate the choice of directions for marketing processes improving using the criteria presented in Table 1, using the example of an industrial enterprise. In this case, according to the authors, in order to choose the best option, it is necessary to consider three scenarios for marketing processes effectiveness achieving in the conditions of an unstable environment: pessimistic (P1), realistic (P2) and optimistic (P3). The initial data and the composite matrix for calculating the Wald (W), Laplace (L), Savage (S), and Hurwitz (H) criteria, as well as the modified Savage and Hurwitz criteria are presented in Tables 2-3.

Improvement directions	Effectiveness, thousand roubles		
	P_1	P_2	P_3
Customer satisfaction analysis (B_1)	6176,55	9785,7	33735,6
Interactions with consumers (B_2)	11117,79	17614,26	60724,08
Marketing strategy (B_3)	6588,32	10438,08	35984,64
Sales management (B_4)	7000,09	11090,46	38233,68
Claim management (B_5)	4529,47	7176,18	24739,44
Market analysis (B_6)	4941,24	7828,56	26988,48

Table 2. Probabilistic marketing processes effectiveness in improvement programs implementation

Version	$\min_j v_{ij} = W_i$	$\max_j v_{ij}$	H_i	$H_{i(mod)}$	S_i	$S_{i(mod)}$	L_i
B_1	6176,55	33735,6	17200,17	-	26988,48	-	16565,95
B_2	**11117,79**	60724,08	**30960,31**	**30960,31**	0	0	**29818,71**
B_3	6588,32	35984,64	18346,85	18346,85	24739,44	-	17670,35
B_4	7000,09	38233,68	19493,52	19493,52	22490,4	**22490,4**	18774,74
B_5	4529,47	24739,44	12613,46	-	**35984,64**	-	12148,36
B_6	4941,24	26988,48	13760,13	-	33735,6	-	13252,76
$\max_j v_{ij}$	11117,79	17614,26	60724,08	**Improvement direction choice**			

Table 3. Summary evaluation matrix

As a result of the calculations performed, taking into account the selected criterion and the current situation, the process of interaction with consumers is selected as the most effective from the point of view of obtaining a focused effect (growth in profit) under risk and uncertainty conditions in order to implement improvement programs. However, based on the results of the evaluation, it is necessary to take into account the resource costs for the improvement program implementation for the full picture of improvement process useful effect obtaining. The achieved process efficiency level is maintained for an equivalent period of time due to the instability of business environment, as well as most marketing processes event nature.

5. Discussion

According to the authors' point view, the developed models for marketing processes improving presented in the studies of Russian and foreign scientists differ in their limited application in terms of the specifics of their application and the technologies used. Some of them propose methods for marketing process parameters evaluation, which consist in selecting criteria (indicators) that reflect the made decisions effectiveness, the use of resources and the choice of optimization methods. In particular, the use of existing maturity models for the diagnosis of industrial processes requires their refinement with the introduction of a matrix form for maturity level evaluation and a vector-spatial method for information data providing.

Fragmentation of marketing processes management problems research in the conditions of an unstable environment, when diverse flows of disturbances, both external and internal, transform processes and reduce their effectiveness, determines the need for their further development. Such researches will allow to provide stability, continuity of marketing processes realization at changes of consumer preferences and a degree of consumers' activity, levels of interactions by formation of the adapted processes management models and algorithms providing disturbance flow influence prevention and minimization, that can lead to marketing process parameters changing and the output of their values from the acceptable range.

The practical significance of the research results is determined by the possibility of applying the proposed model for marketing processes managing in an unstable environment in industrial enterprises of various profiles and industry. The implementation of marketing processes convergent management developed model in enterprises activities will ensure:

- increase in the degree of conjugation, synchrony and purposefulness of the marketing processes behavior;
- timely marketing processes parameters monitoring, determining the types and reasons of deviations for implementing a response in the form of a management action aimed at eliminating the consequences of these deviations;
- in case of deviations in the course of process functioning, an investigation of the appropriate measures to eliminate the deviation to adequacy;
- identification of marketing processes maturity level that reveals the main directions of process change initiated at each level;
- choosing the most optimal version of marketing processes designing on the basis of design process iterative algorithm;
- the formation of an algorithm for marketing processes managing with the selection of appropriate management components, the establishment of control and critical points and interval periods for their measurement.

According to the authors, the following studies can be important directions for further developments in the field of marketing processes management improvement:

- development of methodological support for marketing processes management models implementation in an unstable environment, enabling the operational tracking and predicting of processes conditions changes, taking into account the inertia and consequent transition from one condition to another. This will allow timely detection of critical factors affecting each configuration element quality and business operations effectiveness for effective management decisions implementation process;
- development of an algorithm for compiling a marketing activities program with justification of the costs for its implementation, and a description of the organizational and logical scheme for marketing processes problems solving; management of time and cost marketing activity parameters on the basis of network planning and management methods use, allowing to attribute costs to specific business processes tasks.

It follows from the discussion that marketing processes management improvement in an unstable environment is an important component of marketing activities efficiency increase solving and the enterprise as a whole, improvement programs forming and implementing process, which affects the achievement of a sustainable competitiveness of the enterprise, and requires the creation of methodological support for management actions implementation under the disturbance flow influence.

References

[1] Bart Larivière, Timothy L. Keiningham, Lerzan Aksoy, Atakan Yalçin, Forrest V. Morgeson III, and Sunil Mithas (2016). Modeling Heterogeneity in the Satisfaction, Loyalty Intention, and Shareholder Value Linkage: A Cross-Industry Analysis at the Customer and Firm Levels. *Journal of Marketing Research*: February. Vol. 53, No. 1. pp. 91-109.

[2] Bashirov, I. K. (2015). System approach in the organization of control of marketing activities. *Practical marketing*, Vol. 12, pp.16-19.

[3] Bell R., Buchner A. (2018). Positive Effects of Disruptive Advertising on Consumer Preferences. *Journal of Interactive Marketing*. Volume 41, February. pp. 1-13.

[4] Cenk Kocas, Koen Pauwels, Jonathan D. Bohlmann (2018). Pricing Best Sellers and Traffic Generators: The Role of Asymmetric Cross-selling. *Journal of Interactive Marketing*. Volume 41, February. pp. 28-43.

[5] Demidova L. A., Kirakovsky, V. V., & Pylkin, A. N. (2012). *Decision making under uncertainty*, Moscow, Russia: Hot line-Telecom.

[6] Goeke, C., Gersch, M., & Freiling, J. (2010). The coevolution of alliances and industries: How industry transformation influences alliance formation and vice versa. *Research in Competence-Based Management*, Vol. 5, pp. 79-109.

[7] Hamel, G. (2012). *What matters now: How to win in a world of relentless change, ferocious competition, and unstoppable innovation?* Bass: Wiley.

[8] Ilysheva, M. A. (2009). Maturity models of project management in Russian companies. *Izvestiya Ural State University of Economics*, Vol. 4. pp. 54-59.

[9] Kaluzhsky, M. L. (2016). Business customerization: new horizons of marketing. *Practical marketing*, Vol. 10(236). pp. 3-10.

[10] Mone Sorina-Diana, Marius D. Pop, Nicoleta-Dorina Racolta-Paina (2013). "What" and "how" of marketing performance management. *Management and Marketing Challenges for the Knowledge Society*. Vol. 8, No. 1. pp. 129-146.

[11] Paul, M., Curtis, B., Chrissis, M.B., Weber, Ch.V., Garcia, S. M., & Bush, M. (2002). T*he maturity model of software development processes*, Moscow, Russia: Interface-Press.

[12] Sergeeva, O. E. (2016). Interaction of marketing and logistics in the problem of choosing the preferred business. *Practical marketing*, Vol. 12(1). pp. 96-102.

[13] Schultz Don E. (2013). *Should Marketing Be a Linear Process?* American marketing association.

[14] Schultz Don E., Stanley I. Tannenbaum, Robert F. Lauterborn (1993). *Integrated Marketing Communications*. Lincolnwood, Ill., USA NTC Business Books.

[15] Tretyak, O. V. (2009). *Marketing: New Guides of the Management Model*. O.V. Tretyak. Moscow: INFRA-M, 403 C.
[16] T.I. Urias'eva, T.I. Nikolaeva (2016). Marketing Strategies of Russian Enterprises with a Decline in Purchasing Activity. *Practical Marketing*. Vol. 11(237). pp. 34-39.
[17] Vesanen Jari, Raulas Mika (2006). Building bridges for personalization: A process model for marketing. *Journal of Interactive Marketing*. Vol. 20, Issue 1. pp. 5-20.
[18] Viio, P. & Grönroos, C. (2016). How buyer–seller relationship orientation affects adaptation of sales processes to the buying process. *Industrial Marketing Management*, Vol. 52, pp. 37-46.
[19] Wagner S. M. & Eggert, A. (2016). Co-management of purchasing and marketing: Why, when and how? *Industrial Marketing Management*, Vol. 52, pp. 27-36.
[20] Welsh V. Kathleen (2014). Improving performance in for-profit contracts: a study of buyer-seller communication and red tape. *Management & Marketing*. Vol. 9. No. 4 Winter. pp. 385-402.
[21] Wilson Elizabeth J., Daniel L. Sherrell (2000). Source Effects in Communication and Persuasion Research: A Meta-Analysis of Effect Size. *Journal of the Academy of Marketing Science*. Vol. 21(2). pp. 101-112.
[22] Xiong Guiyang & Sundar Bharadwaj (2013). Asymmetric Roles of Advertising and Marketing Capability in Financial Returns to News: Turning Bad into Good and Good into Great. *Journal of Marketing Research*. Vol. 50. No. 6. pp. 706-724.
[23] Zaguskin, N. N. (2016). Comparative characteristics of the maturity models of management of processes, projects, knowledge of organizations participating in the ISK in the stages of their transformation. *Progresses of modern natural science*, Vol. 1, pp. 78-81.
[24] Ziggers G. W. & Henseler J. (2016). The reinforcing effect of a firm's customer orientation and supply-base orientation on performance. *Industrial Marketing Management*, Vol. 52(1), pp. 18-26.

Economic Growth Humanization: Responsibility of Business and Social Entrepreneurship

Maria Valentinovna KIVARINA[1*], Sergey Pavlovich KULIKOV[2], Konstantin Andreevich ZAGORODNIKOV[2], Vladimir Anatolievich ZHILTSOV[3], Ninel Victorovna KHAN[3]

[1]Novgorod State University named after Yaroslav the Wise, Veliky Novgorod, Russia; E-mail: marewd@yandex.ru
[2]Moscow Aviation Institute, Moscow, Russia; E-mail: ncsrm@mail.ru
[3]Institute of Industry Management, RANEPA – the Russian Presidential Academy of National Economy and Public Administration, Moscow, Russia; E-mail: nchan@ranepa.ru
[*]Corresponding author: Maria Valentinovna Kivarina, Bolshaya Sankt-Peterburgskaya st. 41, Veliky Novgorod, 173003, Russia; E-mail: kivarinam@meta.ua

Abstract

The purpose of this article is to study the essence and nature of Russian entrepreneurship socialization and socialization of citizens in the activities of business structures, as well as to substantiate the role of entrepreneurship in achieving sustainable economic growth of the national economy. The article substantiates the growing role of social factors in modern economic systems. This allows for further examination of the most important directions of economic growth humanization at the present stage of Russia's development. Methods: analysis, synthesis. Conclusion: social innovations introduced by companies and their associations as part of strategies of responsible behavior do not only enable those to declare their civic position but also become an important tool for enhancing the competitiveness of business and humanizing the economy.

Keywords: *social responsibility; corporate citizenship; social innovation; corporation; socialization of entrepreneurship; economic growth.*

1. Introduction

Diversification of the economy and transition to a new innovative way of its development still remains the preferential subject matter, attracting the attention of science and entrepreneurship practice representatives. The formation of new internal productions and technologies in such sectors as construction, transport, tourism, the agro-industrial complex, engineering; as well as the integrated development of the social responsibility of business and social entrepreneurship is a prerequisite for high-quality economic growth.

The relevance of the subject matter is determined by several circumstances. First, the term “factors of economic growth humanization” is quite complex and multilateral, resulting in inconsistency and the associated ambiguity of its interpretations in the scientific literature. Secondly, there is a need to identify and justify the place and role of factors of economic growth humanization in the socio-economic development of society (Cheng, Hong and Kelly, 2013). Finally, in the context of globalization and instability of world economic dynamics, the search for new factors and reserves to ensure sustainable growth becomes relevant, among which labor potential, social capital, relational capital, and scientific knowledge come to the fore.

In connection with the above, the problems of economic growth should be considered more broadly, in terms of the integrity of economic activity, social development and socialization of the business environment. The study of economic growth from the point of humanization makes it possible to present it in a “social dimension”, to analyze numerous links of economic processes with social development at all structural levels, from local to global.

2. Research background: social responsibility of business. Facts and trends

Russian business has deep roots of social responsibility; historically it has been dominated by the ethics of service. Already in the 19th century, the entrepreneurs were not only guided by public interests when developing their business but often served as an engine of social development, improvement of the quality of life and the level of education.

Modern business is a worthy successor to these traditions. If the practice of social responsibility of business in the late 1990s-early 2000s often showed a selfish nature or state pressure, today it becomes an objective reality, a necessary condition for strengthening the entrepreneurial sustainability. On the one hand, any social activity inevitably generates additional costs, which in the short term may cause a decrease in profits and other financial and economic performance indicators (Kaschny, 2018). On the other hand, no business structure can operate isolated from society that can either support it or, on the contrary, prevent any possibility to act. Consequently, modern business, as one of the most important public institutions, becomes included in the system of socio-economic relations and shares the responsibility for the condition of the social services sector, for the welfare of society and its safety with the state (Sheehy, 2015).

Participation of the Russian business in the social sphere is manifested differently (Zhiltsov, Pakhomova and Dubrovina, 2017). Some companies become increasingly responsible, voluntarily undertaking increased social obligations to minimize the negative impact of business operations in the field of economy, ecology and society (Korschun, Bhattacharya and Swain, 2014). Others form an entire sphere of social entrepreneurship, which is not inferior in its innovative potential and social orientations to western analogues (Farrington et al., 2017; Kemper et al., 2013).

The pioneers in the implementation of corporate social responsibility (CSR) were the large Russian corporations, the leaders in their industries with sufficient resources to implement social initiatives. They were the first who began actively creating and implementing their own corporate social responsibility programs.

PJSC Gazprom was one of such companies. The range of its activity has strategic importance for the development of the country's economy and affects the interests of many Russians. This forces Gazprom to consider carefully the interests of society, cooperate fully in the social and economic development of the Russian regions, create a favorable business climate in those regions, and maintain decent working conditions, and social and spiritual well-being of the nation.

PJSC MMC Norilsk Nickel is another example. In 2014, this company switched from traditional charity tools based on patronage to systematic support for CSR initiatives. It began actively attracting local communities to the implementation of social projects in the territories of its presence. Thus, the company's program “The World of New Opportunities”, which aims to support and stimulate regional public initiatives, create favorable conditions and opportunities for sustainable socio-economic development of the Arctic. It is implemented in all its sites: in Norilsk, in Taimyr, and in the Murmansk region.

One cannot but notice such a socially responsible Russian business structure as the “Novard” Group of Companies, which is actively engaged in the creation of a new Russian model of effective business, combining advanced international experience with the best Russian traditions of entrepreneurship and philanthropy. “Novard” is constantly developing and aims to share its accumulated experience with all interested parties, looking for like-minded people who can contribute to the improvement of the Group's activities.

Such organizations as the “Association of Managers”, “Social Charter of Russian Business” and others were created to attract the attention of business to the issues of social responsibility in our country. To assess the involvement of companies in the field of CSR, the Russian Union of Industrialists and Entrepreneurs annually holds the contest “Leaders of Russian business: dynamics and responsibility”, and the association of the largest grant-giving organizations, the “Donors Forum”, organizes an annual competition “Leaders of corporate philanthropy”. For instance, in 2016, despite the ongoing internal crisis, 60 Russian and foreign companies with an annual turnover above 100 million rubles operating in Russia took part in the last competition. According to the results of the competition, the winners were the companies Sakhalin Energy, Sibirskaya Ugolnaya Energeticheskaya Kompaniya (SUEK) and Sistema AFK (Khodorova, 2016).

These and other companies exemplify that in modern business environment, intangible values begin to prevail over material values. The refusal of consumers to purchase the products from socially irresponsible companies, the bankruptcy of the largest corporations, the mergers failed due to low levels of trust showed that social responsibility and business reputation issues are becoming relevant not only in Western countries but also in Russia. That is why Russian business, especially large, on a voluntary basis returns to the revival of traditions of social responsibility, which used to be strong even in pre-revolutionary Russia: the social infrastructure of enterprises is developing, special programs appear, and business actively participates in charity events and actions.

3. Methods: the concept of humanistic development of economic relations

Mutually beneficial cooperation has always existed among people, but it was not always equally beneficial to all participants: one of the partners often received more benefits than the others. The factors of economic growth humanization are aimed at achieving such equality. Being a complex and multidimensional process, humanization manifests itself in strengthening the fundamental function of the economy – to serve the good and the perfection of the life of every person equally, considering his merits and altruistic principles (Malashkhia, 2001). Below is a more specific manifestations of this function:

- economic exemption – the most complete and high-quality satisfaction of existing needs;
- technological exemption – minimization of heavy, routine, vapid work and operations, intellectualization of labor activity and increase in the level of workers' creative potential;
- intellectual exemption – increasing the objectification (justice and morality) of socio-economic relations in the field of employment, property, exchange, distribution, redistribution and consumption;
- social exemption – reduction of the degree of human domination, including by hired labor;
- cultural progress and environmental exemption – enhancing the aesthetic characteristics of the labor processes content and their results, as well as protecting the environment and minimizing the environmental damage caused by production to the nature.

In general, the system of humanistic development of the economy is shown in Figure 1.

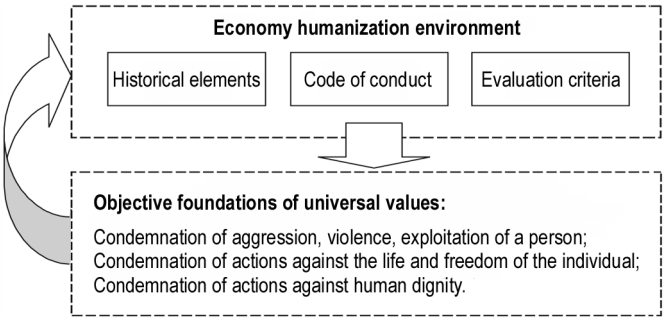


Figure 1. System of humanistic development of the economy

According to Figure 1, general environment required for the formation and manifestation of economy humanization factors includes the following components: specific historical and universal elements of objectively emerging economic and other social relations; codes of conduct in society; evaluation criteria that allow, considering the existing way of life and various points of view, to characterize individual actions and facts of people's behavior, that allow concluding that those are acceptable (correct) or unacceptable because of incompatibility with universal human values.

Such a system of humanistic economic development forms and develops the objective bases (principles) of universal human values. These include the condemnation of violence, aggression, labor exploitation and all other actions aimed at the restriction of the freedom or life of a person and his human dignity. Awareness and acceptance of the above principles, in turn, is a necessary prerequisite for the transition to a humanistic type of social development: “A public person, unlike an autarchic person, must inevitably mitigate his original biological indifference to the well-being of people who are not members of his family... From this point of view, the goal of social cooperation can be described as a provision of the greatest happiness to the greatest possible number of people” (von Mises, 2005, p. 616).

The refinement of the essence of humanization of the economy and economic relations allows formulating the concept of economic growth humanization: it is the evolution of system integrity, which is a complex and multidimensional set of interrelated structural elements, such as humanization of production, technology, labor relations, education, culture, level and quality of life of the population, determining content of social progress.

Based on the above definition, the essence of the economic growth humanization lies in the objective required to form and develop such a socio-economic, political, industrial, ecological and institutional environment with the minimal costs of each participant in social relations associated with the dynamism of economic development, the rapid change of technology, the interaction among the countries at the international level etc.

4. Results

4.1. Factors of economic growth humanization: key efficiency factors

The economic growth in all industrialized countries is inseparable from the humanization process inherent in each of its components, not only externally but also internally. In this case, the dominant factors in modern economic development are human progress, the reproduction of human potential, and the increase of social capital. That is why there are no alternatives to the humanistic type of economic growth currently.

On the one hand, the quality of economic development is determined by the level of innovation progress of mankind. On the other hand, the development and growth of the economy itself raise the requirements for the quality of human capital both of an employee and an individual. Consequently, the factors of economic growth humanization include laying the groundwork for the formation and implementation of human potential ensuring such growth and development (Avilova, 2016).

The level of economic growth humanization can be determined using a variety of criteria of economic, financial, institutional, and especially social nature. Obviously, economic and financial indicators cannot always fully measure and assess the level of factors of economic growth humanization, since they provide only an indirect assessment, which often contradicts numerous social criteria.

The following can be attributed to economic indicators: gross domestic product per capita, the amount of investment in fixed capital per capita, the dynamics of turnover, the investment activity of the industry, the region and the country as a whole, the structure of national wealth, the dynamics of imports and export. But even when all these indicators have a positive trend, it is impossible to draw an unequivocal conclusion about the development of a person and the growth of his actual well-being. Russia, for example, has one of the world's highest values of the accumulated national wealth per capita. However, the structure of the Russian national wealth differs from the wealth of industrialized countries with the share of natural capital on average is 4%, the share of production capital – 18%, and the share of human capital – more than 75%. In the national wealth of Russia, a significant share falls on natural capital – 40%, while only 10% fall on production capital and human capital is estimated at 50%. The given data without complicated calculations reveal one of the reserves for intensification of the process of economic growth humanization in our country – the improvement of investment in human capital.

The following financial indicators of economic growth can be applied to assess the level of humanization: the value of net worth of enterprises, the share of profitable firms in the economy, the indicators of investment activity of enterprises, the dynamics of people's savings, the structure of people's income and expenditure, etc. However, the problem discussed above also raises here. Even with the increase in the net worth of enterprises, the increase in their investment activity, the increase in people's savings, etc., it is impossible to claim that there is an increase in the well-being and effectiveness of the labor potential implementation. Negative adjustments may result in changes in the proportions of distribution of the net profit of the enterprises for consumption and accumulation, a decrease in the share of capital investments in the total volume of investments, as well as the rate of inflation in the economy. These and other factors impede the factors of economic growth humanization.

In our opinion, social criteria are most appropriate for evaluation of the level of economic growth humanization. Those include the following:

- population indicators;
- demographic criteria;
- the indicators of living standards;
- the indicators of the quality of living;
- wage differentiation indicators;
- social inequality criteria;
- the indicators of cultural and spiritual development.

According to the experts of the Institute of Demography of the Higher School of Economics, by 2025 the labor resources of Russia will reduce by 19 million people (Pospelova, 2007). At the same time, the working-age population will decline at a faster pace. The current demographic situation in the country will inevitably lead to a labor shortage in the future. The economic crisis will only temporarily weaken the manifestation of this deficit. The contradiction between the increased demand for labor and the reduction of its supply will be exacerbated by the growth of the average age of the employees, as well as the decline in the quality of labor potential (Korovkin, Dolgova and Korolev, 2006). Under current conditions, the effective use of labor resources in the near future is a necessary condition for the increase in gross domestic product and economic growth, which, in turn, cannot be achieved without large-scale investments in human capital. Such investments bring not only social, but also economic effect. According to experts, every dollar invested, for example, in education, brings from 2 to 10 dollars of net profit (reference!). The investments ensuring the health of the nation should be an important leading area of investment in human capital. According to several researchers, the loss of health resources of the labor force in Russia at the end of 2016 amounts to 48% of the national product.

Another no less important area of investment is the provision of favorable working conditions for employees. It is evidenced by the fact that the proportion of employees receiving various kinds of compensation due to harmful working conditions in industry does not fall below 40% of those employed in this sector (reference!).

The improvement of the level and quality of people's living is the main goal of any progressive state aimed at economic growth. In a narrow sense, the standard of living can be estimated through the prism of the level of consumption of a country's population and the degree of satisfaction of its needs. In a broad sense – through the characteristics of the level of human development and living conditions of the population. It is quite obvious that when assessing the factors of economic growth humanization, it is required to use a broad interpretation of the concept of standards of living, since this allow identifying specific problems behind the screen of general positive changes.

The factors of economic growth humanization are characterized not only by the level, but also by the quality of people's living, determined by the state of the working environment in which a person spends a significant part of his life. To improve the quality of working life, large-scale mechanization and automation of labor processes are required, expanding the creative potential of workers, as well as effective organization of labor, enabling the individual to control and manage the labor process. It is clear that both the person and the state are interested in this.

Numerous domestic and foreign studies focus on

classifications of the growth factors. The most famous are the following gradations of growth factors: extensive and intensive; personal and material, structural, organizational and managerial; economic, political and social; scientific, technical and resource, etc. It should be noted that none of the references mention the factors for the factors of economic growth humanization.

The authors believe that the factors of economic growth humanization should be considered as a multifactorial process. The factors of economic growth humanization are understood as the processes and phenomena that determine the functioning and development of such economic relations that would become the source of the growth of the national welfare. In accordance with this approach, the following classification of factors for the factors of economic growth humanization, united by the selected criteria can be proposed (Figure 2).

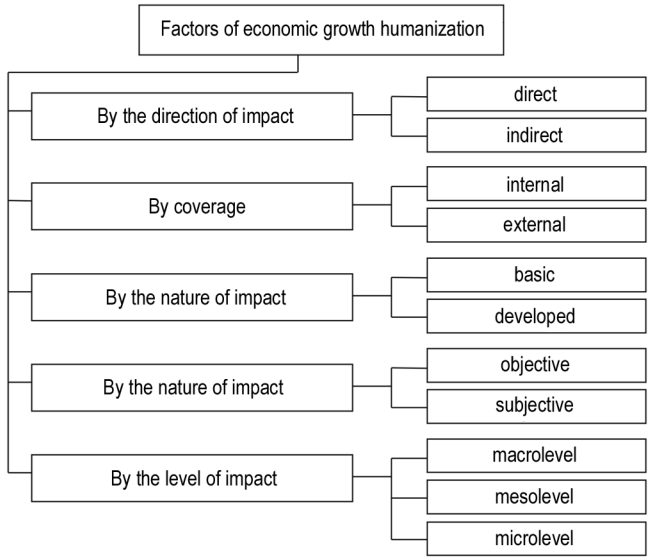


Figure 2. Classification of the factors of economic growth humanization

As can be seen from Figure 2, all factors can be divided by the direction of impact into direct and indirect. Direct factors directly determine the strengthening of the main function of the economy – improvement of the quality of people's living, and include quantitative and qualitative features of human capital; increase in total production; improvement of the technological and technical level of production; intellectualization of labor; equation of the quality of living indicators, the growth of the nation's welfare. The indirect factors, which guarantee the humanization of economic growth under certain conditions, include the increase in morality and fairness of social and economic relations, the procedure for income distribution; the improvement of aesthetic features of the labor process and the result of production.

In terms of coverage, the economic growth humanization factors can be divided into internal (national, state or public) and external (international, interregional or global).

By impact, the factors of economic growth humanization can be divided into basic and advanced. The basic factors that serve as the foundation of economic development are the factors of aggregate supply (the changes in the aggregate expenditures of production resources and scientific and technical progress) and aggregate demand. Advanced factors characterize the superstructure of society and include the state of public consciousness, state governance, political stability in the country, patriotism of citizens, the state of legal institutions, class and inter-ethnic cooperation, minimization of the conflicts within society, the idea of consolidation of society, the professional qualification structure of society (Zhiltsov, 2013) and other criteria for the level of civil society development.

The factors of economic growth humanization can also be classified by manifestation, and divided into objective (growth of national wealth and gross domestic product, reduction of energy and material intensity of gross domestic product, investment growth, increase in life expectancy, environmental protection, level of development of productive forces in the aggregate with labor and health protection, provision of social guarantees, the nature and degree of maturity of economic relations) and subjective factors (public psychology, mentality, national identity, ethnic characteristics, the political state of society, religion, the development of intelligence and the growth of human spiritual wealth, the development of culture, education, science, ethics and art, social cooperation and harmony).

Finally, according to the level of impact and the quality of management, the factors of economic growth humanization can be divided into macrolevel (international peace and cooperation, minimization of inter-country conflicts), mesolevel (incitement of the development of social industries, enabling the participation of all citizens in public life, the development of social entrepreneurship), and microlevel (creation of conditions for personal expression of the individual, the right of everyone to participate in decision-making, improvement of social and civic responsibility).

The listed factors of economic growth humanization are interdependent, they act in interrelation and interdependence. The complex interweaving of these factors determines the unity of the process of economic growth humanization. Consequently, the content of economic growth humanization is manifested in strengthening the social and spiritual orientation of economic development, forms of organization and conditions of research and production activity to a person as the highest value, to overcoming the technocratic tendencies that contradict the needs of a person and the comprehensive, free professional and personal development of each citizen. This process includes two components. First, the increasing utilization of the results and potential of science in order to increase the welfare of the nation. Secondly, the improvement of the sphere of material and non-material production to create the conditions that most fully provide for self-realization and the increase of employees' creative potential, increasing labor productivity through the most demanded set of individual competencies. Therefore, the humanization of economic growth is a process that can either slow down or speed up the development of a country, which is manifested in socio-economic relations in modern Russia.

In terms of the above, the key factors for economic growth humanization are the increase in the level of social responsibility of business and the development of social entrepreneurship, which allows fully and qualitatively meet the needs of a modern person, comprehensively developing his abilities and creative potential.

4.2. Social entrepreneurship: scenarios for development

Social entrepreneurship is an even newer way of social and economic activity, combining entrepreneurial innovation, sustainable self-sufficiency and the social nature of a company. It is based on the functioning of special business structures operating on the principles of financial discipline, an innovative approach to business, commercial efficiency, coopetism (Beder, 2011; Kim, 2018), formed to address a specific social problem.

The above definition allows distinguishing the main features of social entrepreneurship. These include:

1) the primacy of social mission over the commercial – the social effect obtained in the course of the company's activities is not a by-product (as it can be in the private enterprise sector), but the targeted result of its operation;
2) business ethics and culture of entrepreneurship, which is expressed in a personal commitment of all participants in the company's social mission;
3) sustainable commercial effect, ensuring self-sufficiency and competitiveness of the company and each profe-

ssional individual, which makes it relatively independent of external financial resources in the form of grants and charitable contributions;

4) innovation, realized, on the one hand, by means of new ideas to solve an existing social problem, and on the other hand, through non-standard combinations of economic resources aimed at achieving the goals set in the company and, above all, through a unique combination of competencies of specific professional individuals.

The end of the twentieth century was especially rich in the development of social initiatives. It is enough to recall the wave of cooperative movement in Europe, the public-private partnership, numerous agreements on fair trade, the tripartite intersectoral interaction, the institutionalization of corporate social responsibility, the emergence of corporate citizenship phenomenon, and much more. All of these resulted from objective changes in the living conditions of the world, individual states and specific communities of people who made the state, commercial and non-profit organizations change their role in the solution of the social problems. The main trends contributing to the emergence and development of social entrepreneurship were the following (Moskovskaya, 2011, p. 18):

- low susceptibility of several social problems (poverty, unemployment, social exclusion, etc.) to traditional solutions, used by the state and non-profit organizations;
- sustainable coexistence of market and non-market, developed and undeveloped social and economic segments within one state;
- an increase in social inequality between and within countries;
- an increase in the number of non-profit organizations and intensified competition for the resources of the state and charitable foundations;
- commercialization of public services and, as a result, the increased competition between business and the non-profit sector, which the latter often loses;
- an increase in the rate of institutional changes in social relations that promote individual competitiveness, projects, start-ups, and innovative companies.

It is still unclear whether social entrepreneurship can solve these problems (Mosakova). This will largely depend on the prospects for its sustainable development. However, it can be assumed that every social entrepreneur, in one way or another is a certain response to the challenges arising in modern society.

There are two possible scenarios for the development of the Russian entrepreneurship socialization in the near future: “inertial” (unfavorable) and “modernization” (favorable). Each considers the previous experience, and the difference is the nature of the participation of public authorities in the development of socially responsible behavior practices.

The key provision of the “inertial” scenario is the influence of the state on the socially responsible behavior of business, similar to the modern one, which will lead to the preservation of orientation towards an independent solution of social problems by each sector. As a result, this scenario assumes a low probability of institutionalization of social responsibility and social entrepreneurship. Responsible business practices will find less new followers; remain fragmented with a high percentage of non-systemic actions, low level of transparency and accountability. In such a scenario, modern Russian leaders of socially responsible behavior will retain the current level of CSR practices.

In contrast to the previous one, the “modernization” scenario is based on the fact that the crisis in Russia will contribute to intensified socialization of the business environment. The leading role in regulating this process should belong to the state since the non-profit sector is not yet capable of exerting a decisive influence on CSR. Despite the fact that within the framework of political competition, the increasing involvement of public authorities in the development of social responsibility is difficult in the near future, it is necessary to find opportunities for implementation of state policy related to promoting socialization of business, including using the modernization course of the President of the Russian Federation.

5. Discussion: problems and prospects of the economy humanization

There are several reasons for the low socialization degree of Russian business structures and humanization of the economy:

1) Low social activity of the Russian public resulting in practically no pressure on companies from civil society.
2) Extremely noticeable role of the government and administrative bodies. One way or another, companies in the Russian market face pressure from state or local authorities. Therefore, business in Russia often perceives corporate social responsibility as a ballast, the costs of which must be minimized (Adhikari, 2016). For this reason, such activities are ineffective.
3) As a rule, social and charitable activities of Russian companies are chaotic with no system. In some cases, those are accompanied by excessive financial amounts, the size of which does not correlate with the company's objective financial indicators.

There are other reasons for the low social activity of business in Russia (Avilova, 2016):

- economic restructuring;
- extensive territory, low average population density;
- a great number of single-industry towns, whose infrastructure is largely dependent on the city-forming enterprise;
- concentration of capital in remote regions of Russia (Western Siberia, the Far East).

The authors suggest the following solutions to intensify socialization of the Russian business environment:

1. Working with entrepreneurs. Such work must be conducted not only with large but also with medium and small businesses, explaining to entrepreneurs the economic and social benefits associated with the implementation of CSR practices, as well as motivating companies to socially responsible behavior;
2. Building and developing a unique Russian model of a socialized business environment with the ability to evaluate its implementation. The evaluation criteria should be based on the current traditions, norms, and morals of Russian society. This will contribute not only to the conflict-free development of various approaches to the social responsibility of business, but also give a new general incentive for the development of socialization of entrepreneurship in Russia;
3. Legislative consolidation of publicity of social reporting, as well as toughening the sanctions against the employers (owners) in case of discrimination or violation of employees' labor rights and environmental crimes.

It is possible to define the entire range of social problems in Russia that will particularly relevant in the next decade, which can be addressed with business participation:

- Improving labor productivity, creating jobs, based on the system of standardization of professional qualifications;
- Developing social programs for employees, supporting their volunteer initiatives;
- Creating conditions for healthy active aging. “Silver economy” – employment, training throughout a professional life, training of elderly people;
- Supporting ecology and environmental projects: waste management, reduction of energy consumption; environmental education; organization of eco offices;
- Creating and supporting IT infrastructure for the exchange of professional competencies, social initiatives. Creating social networks, aggregators, and crowdfunding platforms;
- Working with the local community, developing company's

regional offices.

- Supporting social entrepreneurship as a promising tool for the solution of social problems;
- Working with children in orphanages, keeping the focus on preventive measures – work with crisis families, early adoption measures, employment of graduates;
- Supporting sick children, people with disabilities.

Speaking about the social significance of entrepreneurship, it is necessary to emphasize two points:

1) By implementing practices of corporate social responsibility, companies can minimize potential business risks by identifying and accounting for "bottlenecks" that, one way or another, arise in their relationship with society. The identification of such gaps is the first step towards the socialization of business. It can be compared with insurance that protects the company from unexpected difficulties and problems in its further activities. For example, in the framework of the universal fight against obesity, the food industry has been struggling to meet the expectations of society for several decades. Therefore, the resources spent on changing key business processes in the industry cost companies a fortune, while CSR activists have predicted this problem long before it appeared. Therefore, one of the additional functions of socially responsible behavior is the early identification of difficulties that companies may face in the future.

2) Corporate social responsibility can transform the problems arising in the company's environment into additional opportunities (advantages) for the business. For example, in Ghana, the indigenous population suffers from iodine deficiency. The British company Unilever identified this problem and created a special iodized salt (Watson, 2015). To produce and sell the new product in a given country, the company restructured its entire business model. The main production workshops were relocated to the rural areas in order to create new jobs there, while the distribution was implemented by the sellers on bicycles. Thus, to meet the social and medical needs of the population, the "Unilever" company created a new brand and a new market.

These examples prove that companies may well use their core business to solve social problems. This is not charity or philanthropy – it is social innovation. Such social innovations, introduced as part of responsible behavior strategies, not only enable companies to declare their citizenship, but also become an important marketing tool, making it possible to stand out, develop new products and markets, create an emotional connection between a brand and its consumers, thereby increasing loyalty and the number of social entrepreneurs.

6. Conclusion

An understanding of including all types of citizens' socialization in the daily activities of business structures as a factor of social development and increasing trust and competitiveness in Russian business both in the country and abroad should become the incentive for socially responsible behavior in Russia. It should create the conditions for social stability, sustainable economic growth and solution of the environmental problems, a sign of transparency in the processes of interaction among business, government and society, which is an important image component of the state. Socialization of entrepreneurship in Russia is currently at the stage of formation and initial development. Based on domestic and foreign experience, there is a gradual formation of a unique Russian model of a socialized business environment. Every day, the business community of our country is increasingly involved in this process, which, on the one hand, is enforced by the state and the world community, and on the other hand, is explained by the business awareness of the economic and social benefits of responsible behavior. Low participation of civil society in this process is the most serious drawback in our country. Its solution can have a great influence on the development of social responsibility culture and direct it to the necessary social environment. In any case, the formation and improvement of CSR practices and social entrepreneurship – as a mechanism for an immediate response to social needs – reveals new opportunities and prospects not only for the development of Russian entrepreneurship, but also for the entire society, which undoubtedly can influence the sustainability of economic growth, humanization and welfare of the country as a whole.

References

[1] Adhikari, B. K. (2016). "Causal effect of analyst following on social responsibility". *Journal of Corporate Finance* 41, 201-216.

[2] Avilova, M.G. (2016). "Corporate Social Responsibility in Russia: Trends, Problems, and Solutions". *Scientific and Methodological Electronic Journal "Kontsept"*, 34, 1-5. http://e-koncept.ru/2016/56712.htm.

[3] Beder, S. (2011). "Coopetition" In N. Cohen & P. Robbins (Eds.), *The SAGE References Series on Green Society: Toward a Sustainable Future: Green business: An A-to-Z guide* (pp. 106-107). Thousand Oaks, CA: SAGE Publications, Inc. DOI: 10.4135/9781412973793.n31

[4] Cheng, I.-H., Hong, H., and K. Shue (2013). "Do Managers Do Good with Other People's Money?" *NBER Working Paper* No. 19432. DOI: 10.3386/w19432.

[5] Farrington, T., Curran, R., Gori, K., O'Gorman, K. D. and C. J. Queenan (2017). "Corporate social responsibility: reviewed, rated, revised". *International Journal of Contemporary Hospitality Management* 29 (1), 30-47. DOI: 10.1108/IJCHM-05-2015-0236

[6] Kaschny, M. (2018). "*Innovation and transformation*": Springer Verlag, Heidelberg, Germany.

[7] Kemper, J., Shilke, O., Reimann, M., Wang, X., and M. Brettel (2013). "Competition-motivated corporate social responsibility". *Journal of Business Research* 66 (10), 1954. DOI: 10.1016/j.jbusres.2013.02.018.

[8] Khodorova, Y. (2016, December 01). "Leaders of Corporate Charity". *Electronic Journal about charity* "*Filantrop*", 43 (92), 27, http://philanthropy.ru/analysis/2016/12/01/43927/

[9] Kim, K.-Ho. (2018). "Coopetition". *Organizational Dynamics*, 32 (2), 1-6. DOI: 10.1016/j.orgdyn.2018.09.005.

[10] Korovkin, A.G., Dolgova, I.N., and I.B. Korolev (2006). "Labor shortage in the Russian economy: a macroeconomic assessment". *Forecasting Problems*, 4 (6), 5.

[11] Korschun, D., Bhattacharya, C. B., and S. D. Swain (2014). "Corporate social responsibility, customer orientation, and the job performance of frontline employees". *Journal of Marketing* 78 (3), 20-37. DOI:10.1509/jm.11.0245.

[12] Malashkhia, G. (2001). "*Humanization and Dehumanization trends in the Economy*": Petropolis, St. Petersburg.

[13] Mises, L. von (2005). "*Human Activity: A Treatise on Economic Theory*": Publishing House Sotsium, Moscow.

[14] Mosakova, E.A. (2017). "Theoretical Foundations of the Competitiveness of Countries in the Modern Global World". *Economics and Management: Problems, Solutions* 2 (2), 3-9.

[15] Moskovskaya, A.A., ed. (2011). "*Social Entrepreneurship in Russia and in the World: Practice and Research*": National Research University Higher School of Economy, Moscow.

[16] Pakhomova, O.A., and O.A. Dubrovina (2017). "A system approach to managing the social sphere of the region". *Economics and Entrepreneurship* 8-1 (85-1), 352-356.

[17] Pospelova, E. (2007). "*Migrants will save Russia*" RBKdaily 7 (8), 12. www.hse.ru/news/1165619/5242525.html

[18] Sheehy, B. (2015). "Defining CSR: problems and solutions". *Journal of Business Ethics*, 131 (3), 625-648. DOI:10.1007/s10551-014-2281-x.

[19] Watson, L. (2015). "Corporate social responsibility, tax avoidance, and earnings performance". *The Journal of the American Taxation Association* 37 (2), 1-21. DOI: 10.2308/atax-51022

[20] Zhiltsov, V.A. (2013). "Regional qualifications system – an innovative solution for the innovative economy". *Vocational Education and Job Market* 1 (1), 32-34.

Modern Problems of Career Advancement and Rotation of Researchers as an Issue of Social Responsibility

Sergey Vyacheslavovich NOVIKOV[1*], Elvira Ramilyevna CHERNOVA[2], Inna Anatolyevna KULKOVA[3], Evgenia Evgenyevna LAGUTINA[4], Mariia Igorevna PLUTOVA[5]

[1]Deputy Director, Moscow Aviation Institute Moscow, Russia; E-mail: novikoserg@rambler.ru
[2]Assistant Professor, Sterlitamak branch of Bashkir State University, Sterlitamak, Russia; E-mail: tigp-strbsu@mail.ru
[3]Assistant Professor, Ural State University of Economics, Yekaterinburg, Russia
[4]Assistant Professor, Ural State University of Economics, Yekaterinburg, Russia; E-mail: lagutinaee@usue.ru
[5]Ural State University of Economics, Yekaterinburg, Russia
[*]Corresponding author: Sergey Vyacheslavovich Novikov; 4 Volokolamskoe Shosse, 125993 Moscow, Russia; E-mail: novikoserg@rambler.ru

Abstract

The staff shortage in the economies of developed countries, especially in the field of intellectual activity, is aggravated today by the unfavorable demographic situation. Based on the above, the article shows the approach to the managerial problem of the lack of qualified personnel in Russian science. Based on the research, a number of proposals are provided that are aimed at creating favorable conditions for the career advancement of scientific and scientific-pedagogical personnel in the labor market, creating an effective system of motivation for scientific work, stimulating the influx of young personnel in the scientific sphere, the sphere of education and high technologies, as well as its reservation in innovation and science spheres. Disclosing the prospects for the development of career advancement and rotation of researchers in Russia, to justify the pedagogical conditions for career advancement of researchers in professional education in Russia. To determine the dynamics of the number of postgraduates, professors and high school teachers in Russia and, based on the conducted studies, to make a forecast up to 2030 as compared to 2010. The comparative analysis and systematization methods were used in conducting the study. The study will allow improving the efficiency of career advancement and rotation of researchers in Russia. The conclusion is drawn that the requirement of mandatory defense of a scientific dissertation, more specifically, of obtaining a scientific degree, for the Russian scientific personnel should be abolished. Such a criterion of the scientific work effectiveness as the publication activity should be excluded for teams engaged in applied research.

Keywords: *career advancement; staff rotation; researcher; staff shortage; professional career; personnel management; innovative management.*

1. Introduction

As the role of science in economically developed countries becomes more and more prominent, the constant update of the socio-professional structure of society that is accompanied not only by increased professional mobility but also by the need for continuing education of workers in many sectors of the economy and the service sector becomes more important as well. However, the inertia and conservatism of the socio-professional structure as an organic component of the gerontological process do not allow fully disclosing this objective process.

The desire to increase the dynamism of the social structure turns into an acceleration of the change of generations through the establishment of upper age limits for employment and a significant rejuvenation of personnel. This process does not always lead to positive results since innovative production requires not only young specialists but also highly qualified employees with modern knowledge and developed adaptation skills.

As a result, there is an acute shortage of specialists with an innovative mindset who can combine production with scientific creativity in order to increase competitiveness in the international market for goods and services. Thus, the problems of the professional structure dynamics go beyond the national framework in the field of international migration.

The staff shortage experienced by the economies of developed countries (primarily in the field of intellectual activity) is aggravated by the unfavorable demographic situation. In Russia, this is due not only to the natural decline in the birth rate but also to the continuing negative impact of the “demographic hole”: by 2019, the number of graduates has decreased by 35-40% compared with the 2000s (Vinokurova, 2018).

2. Literature Review

Korkmaza (2015), Stricker (2015), Nichols (2010), Heitkemper (2010), Rindoks (2008), and Verma (2004) revealed that a number of factors affect the career advancement of scientists and researchers, such as the interest in learning, mentoring at all stages of development, cooperation with colleagues within and outside of their discipline, family and social support, which contribute to a productive and fruitful career.

The studies of the career phenomenon are multifaceted and are conducted mainly in such areas as psychological and acmeological studies of career motivation (McWhirter et al, 1998), factors of personality development during career advancement, successful development of an individual career (Boser, Palmer and Daugherty, 1998; Koszalka, Grabowski and

Darling, 2005); socio-economic studies of the opportunities for managing the careers of personnel (Mitina, 1998); and pedagogical research on the problems of professional self-determination and the readiness of high school students to choose a profession (Sokolov, Sergeeva and Samokhin, 2018; Shchepkina, 2017).

The concept of "career competence" that relatively recently appeared in the works of foreign scientists was developed in the works of domestic scientists in the following areas: psychological and acmeological studies of the essence and structure of career competence as an integral part of professional (Bogdanov and Vyatkina, 2017) self-assessment of career competence of teachers and teacher's professionalism (Gluzman and Gorbunova, 2017); pedagogical research of the conditions for improving the professional competence of teachers through the development of their career competence.

3. Methods

The methods of the research include general scientific and economic methods and are a synthesis of abstract-theoretical analysis, systemic, factor, and structural-functional analysis, logical approach, statistical methods, simulation, situational and quantitative approaches. Specific methodical tools of economic and mathematical modeling and other methods are used as well.

The information and regulatory and legal framework of the study includes statistical materials, reporting data of the government agencies, materials of monographs and publications in periodicals, Internet resources of Russian leading research centers, the results of own research, as well as the Decrees of the President of Russia, resolutions of the Federal Government, other regulatory legal and methodological documents of the legislative and executive branch authorities of all levels of the Russian Federation government, including the program documents.

4. Results

In the modern world, the role of the human factor in solving the tasks of accelerating the country's socio-economic development is constantly increasing, new demands are placed on specialists, and therefore the problems associated with the formation of the teacher's personality and skills of professional interaction are exacerbated. The life activity within the framework of such an increase in tariffs requires its full functioning as a person: the ability for self-determination, for personal and professional self-improvement.

The pedagogical community requires people who have the ability to make responsible decisions in the choice situations and predict their possible consequences, who are ready for cooperation and creative activity, are open to experience and aware of their self-esteem.

The problem of professional and personal growth of a university teacher is still not studied sufficiently, although the development of his/her professional activity is in the focus of psychology. Thus, it is noted that along with the general and intellectual culture associated with positive personality development, it is important for a teacher to have a culture of communication and social interaction based on respect for the dignity of another person and self-preservation.

Russian scientists are focused on scientific mobility, which is manifested in the desire to *improve their scientific qualifications ⇒ to obtain a scientific degree ⇒ to get an academic rank ⇒ to be appointed to a higher scientific position*. The listed status settings are closely related to the growth of the material well-being of the scientist. However, there is an obstacle in the way of accelerating career advancement, which makes a scientific career unattractive for young people. A nationwide survey of researchers showed the following stages of the average duration of career advancement: scientific development – ten years; achieving scientific recognition – fifteen years; achieving the status of a person in charge – fifteen years; achieving decent wages – fifteen years. Thus, *most of the expected researcher's career achievements come about by the age of 40-42 years*. The longest period of researcher's career advancement is observed in the technical and natural sciences. In research organizations, there is an acute shortage of the following specialists: engineers in various fields; programmers; quality managers; biologists and biotechnologists; ichthyologists; highly skilled electronics engineers; genetic scientists; meteorologists; nanotechnologists; patent examiners; managers to promote innovation in production; specialists in the implementation of developments and their promotion to the market of innovative products; experts in the field of applied physics; plant breeders; and chemical process engineers.

The cooperation between universities and production companies regarding the training of specialists capable of effectively participating in the implementation of applied scientific research and organizing innovative production leaves much to be desired. As the results of the nationwide expert survey show, universities implement a large program of activities together with a partner company for professional training and advanced training of specialists who are able to participate in a research project, but only every second university. The general situation is as follows:

- the development of a system of practical training and internship of university students in production companies is generally well established, but a quarter of universities do not have this opportunity;
- the participation of production companies in improving the curricula of universities and the participation of company employees in teaching at universities is "moderately" established, since 40% of universities do not implement this;
- 55% of universities coordinate with production companies the programs for improving the quality of education and personnel training for companies;
- the development of a system of practical training and internship of researchers and university professors in companies has a negative trend, as it is implemented in less than half of universities (45%).

From 2010 to 2017, there was a reduction in the number of researchers in the following areas of science: natural sciences – by 10.5%, technical sciences – by 0.23%, and agricultural sciences – by 18.78%. During the same period, the number of researchers in the social sciences increased by 26.34% and in the humanities – by 8.8% (Statistical Yearbook of Russia, 2018).

In 2017, the percentage of researchers under 29 was 18.45% of the total number of researchers. The average age of researchers is steadily decreasing: in 1994, it was 45 years old, in 2000 – 50-59 years old, in 2017 – 30-39 years old (Statistical Yearbook of Russia, 2018). It should be noted that the largest number of researchers are candidates of sciences (20,772 persons) of 30-39 years, which indicates a positive trend of a large influx of young people into science. The reason is increasing the prestige of science in the eyes of young people.

Post-graduate education is an important source of personnel for science. However, due to the influence of the "demographic" pit, which will last until 2020, the sources of knowledge workers will be reduced. The mid-term and long-term forecasts carried out in 2017 illustrate the following situation.

The number of post-graduate schools providing post-graduate training is expected to reduce by 2025 as compared with 2010. Accordingly, over the same period, the number of graduates from post-graduate schools will decrease (Figure 1).

The number of university and institute graduates (bachelor's degree + master's degree + specialist's degree) will reduce by 2025 as compared with 2010 (Figure 2). This will lead to a reduction in the number of university teachers by 2025 as compared with 2010 (Figure 3).

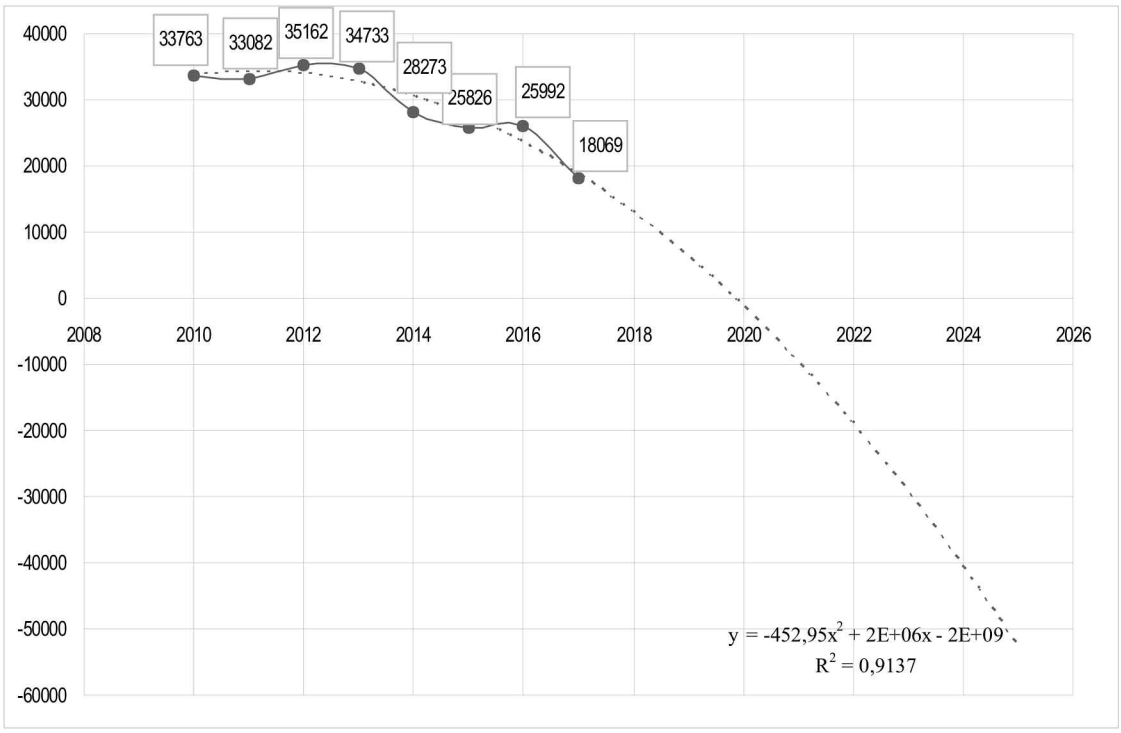


Figure 1.
Graduation from Russian post-graduate schools and the 2025 forecast, persons

Source:
Statistical Yearbook of Russia, 2018

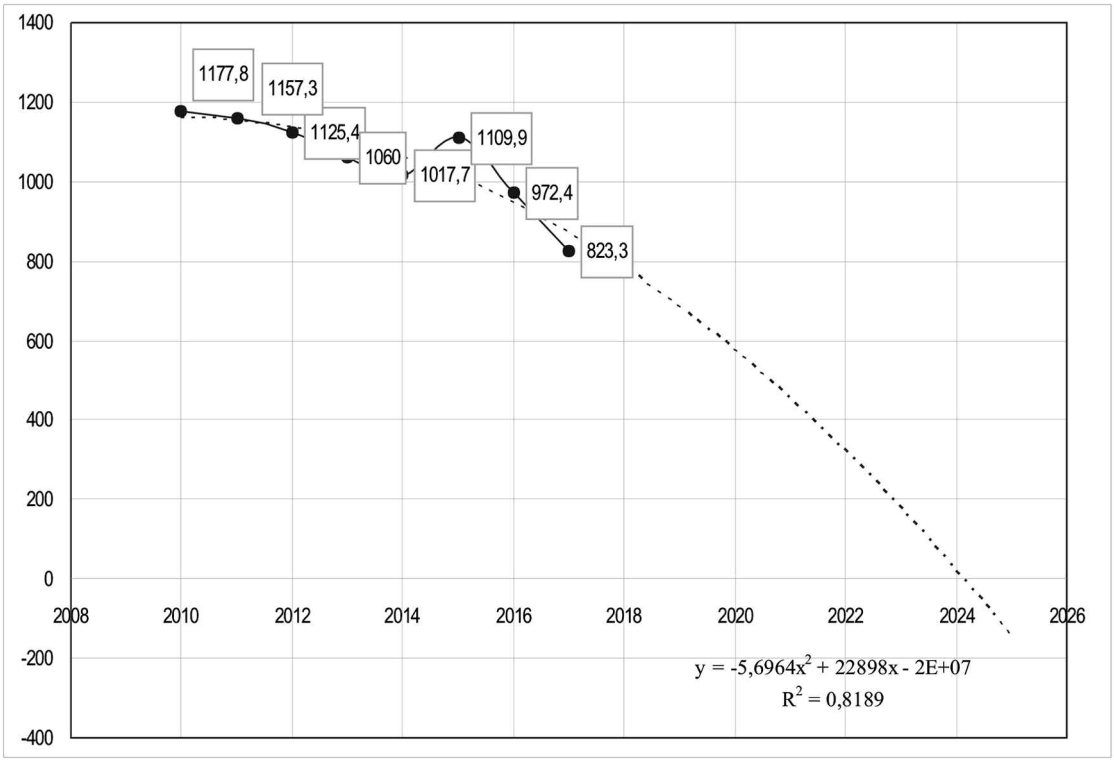


Figure 2.
Graduation of students from Russian state and municipal organizations of higher education and the 2025 forecast, thousands of persons

Source:
Statistical Yearbook of Russia, 2018

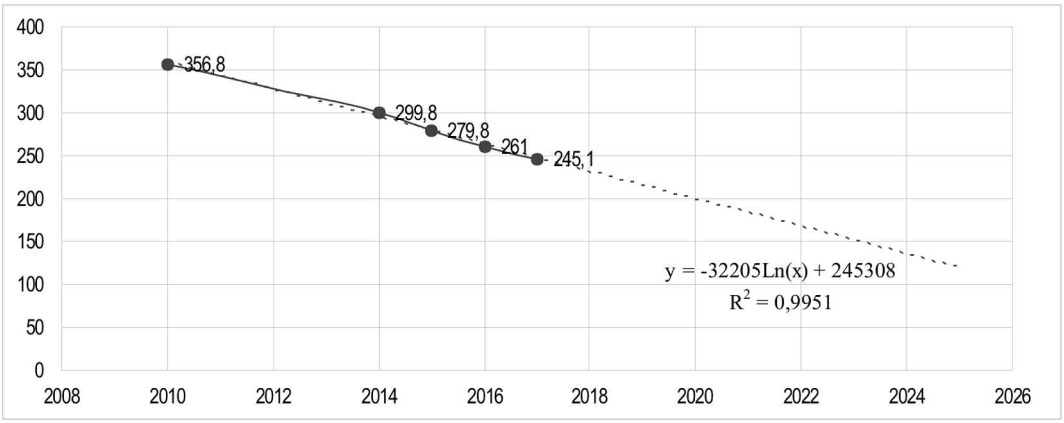


Figure 3.
The number of professors and teachers of Russian state and municipal organizations of higher education and the 2025 forecast, thousands of persons

Source:
Statistical Yearbook of Russia, 2018

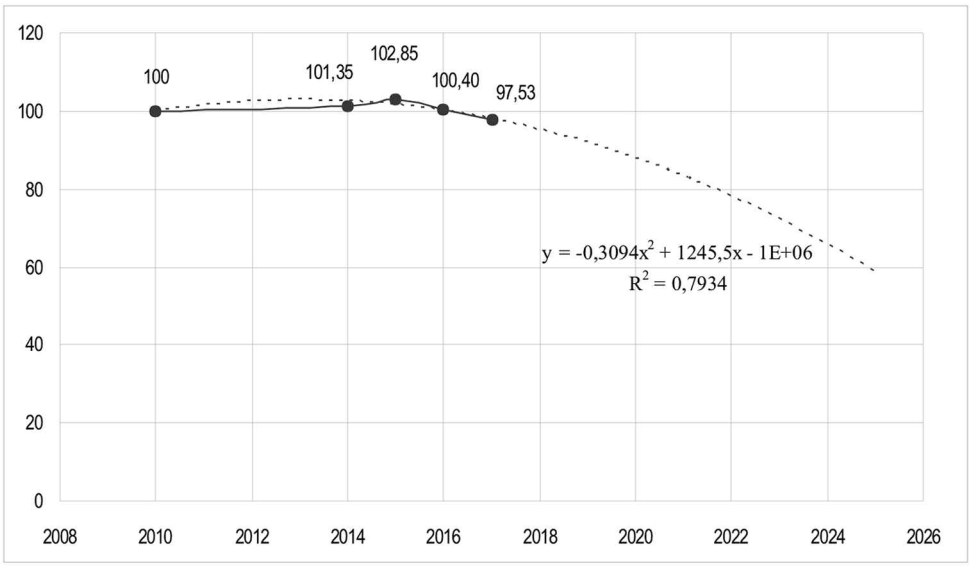


Figure 4.
The ratio of Russian researchers engaged in R and D and the 2025 forecast compared with 2010, %

Source:
Statistical Yearbook of Russia, 2018

Taking into account the above-mentioned changes in the number of graduates from post-graduate schools and universities, the forecast for the number of researchers is as follows: by 2025, the number of personnel of research organizations will decrease by approximately 23% compared with 2010 (Figure 4).

5. Discussion

The released faculty staff may be involved in science, but the effect of such a step is unknown, since the scientific potential of the released faculty is unknown. Thus, while maintaining the current conditions of staffing research organizations, the desired increase in the number of researchers by 2025 is not expected.

The reduction in the number of personnel of research organizations can be significantly higher than the given forecasted indicators due to the increase in the average age of researchers, which today remains at the 2000 level and, according to official statistics, in 2017 was 30-39 years.

There are serious problems in training of scientific personnel in post-graduate schools. Since the mid-1990s, Russia has witnessed a rapid growth in the number of post-graduate students due to the increased admission to post-graduate schools, as well as the opening of new post-graduate schools, mainly at universities. During the period from 1995 to 2012, the number of post-graduate students increased by 2.4 times, including by 2.6 times in universities and by 1.3 times in research institutes, and only in 2013 the number of post-graduate students started to reduce moderately, mainly because of the "demographic hole" (Statistical Yearbook of Russia, 2018). These data indicate that over the past 10-15 years, *post-graduate school has lost its academicism and in terms of the mass training has become equal to the intellectual level of simple university training*. Today, it cannot be said that post-graduate schools provide training for scientists and teachers only. Most post-graduates are far from these professions. *In some aspects, the function of post-graduate school has become "amorphous"*. The motivation of at least half of the future post-graduate students to enter post-graduate school is not quite clear. Most of them enter post-graduate school right after graduating from the university, having no work experience and not having tested in practice the knowledge obtained during their studies at the university. In 2010, 3.7% of the graduates entered post-graduate school several months after graduation from the university, and in 2017 – 3.2% graduates, and together with the number of people who did not work during the period between the graduation and the admission to post-graduate school, this number exceeds 4%.

When deciding to enter post-graduate school, at least half of graduate students intend to pursue science in the future. This is a good indicator, which has not changed since 2000. As is evidenced by the results of the study, over the past 19 years, the hierarchy of motives for entering post-graduate school as a whole has not changed. First, there is the desire to pursue science or teach in high school. However, among those who, upon entering post-graduate school, intended to professionally engage in scientific work after graduation, no more than 30% retain this intention by the time their postgraduate education is completed (another third want to become a university teacher instead of a scientist, and one third want to work in production).

The proportion of post-graduates who defended a thesis in 2017, in relation to the total number of post-graduate students in the same year, was 8.9%, which is less than in 2000 (17.4%). From the point of view of training highly skilled intellectual labor specialists, the "blank" work is characteristic of post-graduate studies in all fields of science, but especially in the social sciences. It is noteworthy that almost 43.5% of post-graduate students specialize in the humanities and social sciences, while the proportion of researchers working in this field is just over 5% (Statistical Yearbook of Russia, 2018).

The dilution of the candidate of science diplomas in a wide range of professions not related to universities and research institutions devalued the status of university professors and academic scientists. They have lost the symbol of their value and professional identity. In addition, the role that candidate of science degrees currently play in hiring specialists to high-tech enterprises and to design and engineering companies (where the main criterion for professional suitability, after the country entered the market, is the level of creative potential and practical skills) is not quite clear.

6. Conclusion

The experience of the modern science development (here one can recall such scientists and industrialists as Henry Ford, Bill Gates, Steve Jobs, or Mark Zuckerberg, as well as a great number of designers of the past in such areas as the automotive industry, aircraft industry, rocket science, genetics (monk Gregor Mendel), paleontology and anthropology (Father Teilhard de Chardin)) suggests that *the requirement of mandatory defense of a scientific dissertation, more specifically, of obtaining a scientific degree, for the Russian scientific personnel should be abolished*. First, an overly bureaucratic form of self-fulfillment in science due to science-like compilations (meaning dissertations) has nothing to do with scientific practice. Second, science cannot be taught, unless it is genetically given to someone. For researchers, only the form of targeted self-education is acceptable, not the forced "breaking" of their intellectual potential under the subjective self-will of incompetent bureaucracy.

Such criterion of the scientific work effectiveness as the publication activity should be excluded for teams engaged in applied research, as it distracts researchers from meaningful work and forces them to engage in formal "bureaucratic reply" and replication of "mutual collegial references". It is well known that no researcher who develops an applied task will, either ever or prior to patenting or releasing to manufacture, publish the results of their scientific work, especially those of commercial interest.

The salary of a teacher of a university or an institute leaves much to be desired – according to the Federal Statistical Service, the average salary of a Russian teacher at a university or an institute in 2016 was 49,991 rubles and in January 2018 – 77,167 rubles, but it should be noted that basically the salary of university teachers increased due to the reduction in the number of teachers (in 2017, the number of faculty members of Russian state and municipal educational institutions of higher education decreased by 15.9 thousand persons, as compared with 2016) and the almost double increase in the teaching load as a result. It should also be noted that the statistical data are overrated as the actual average salary of a post-graduate student teaching at a university is twice or even three times less as in calculating the average monthly salary of employees of an educational institution, the salary of the rector and teachers is summed up. This is not attractive for university graduates whose professional plans are predetermined not by the social significance of a particular profession, but by its prestige and profitability. According to the last two criteria, such professions as a scientist or a university teacher today are significantly losing as compared to the professions of an economist, a lawyer, a designer, or a manager.

Consequently, in order to increase the career advancement of a university teacher, it is necessary to financially support post-graduate students and to stimulate their interest in achieving scientific discoveries. It should be noted that professional development within the framework of the profession of a university teacher has its own specifics: the choice of a career path depends on the interests, professional attitudes, and motives of professional activity. Consequently, a career is a natural result of a successful professional activity of a teacher, aimed at realizing personal and business potential associated with the system of their life values. Thus, it is in the pedagogical profession that the development of professional and personal potential and material incentives for post-graduate students is an indispensable condition for achieving professionalism and career advancement.

References

[1] Boser, R.A., Palmer, J.D., and M.K. Daugherty (1998). "Students' attitudes toward technology in selected technology education programs". *Journal of Technology Education*, 10(1), 4-16.

[2] Heitkemper, M.M. (2010). "Asking the why questions: a career in science". *Kaohsiung J Med Sci*, 26(6), 22-27. https://doi.org/10.1016/S1607-551X(10)70054-1

[3] Korkmaza, H. (2015). "Factors influencing students' career chooses in science and technology: Implications for high school science curricula". *Procedia – Social and Behavioral Sciences*, 197, 966-972. https://doi.org/10.1016/j.sbspro.2015.07.284.

[4] Koszalka, T.A., Grabowski, B.L., and N. Darling (2005). "Predictive relationships between Web and Human Resource use and middle school students' interest in science careers: An exploratory analysis". *Journal of Career Development*, 31(3), 171-184.

[5] McWhirter, E. H., Hackett, G., and D.L. Bandalos (1998). "A causal model of educational plans and career expectations of Mexican American high school girls". *Journal of Counseling Psychology*, 45(2), 166-181.

[6] Nichols, R.W. (2010). "Ethical currents in a career in science and technology: A case study R.W. Nichols". *Technology in Society*, 32, 18-24.

[7] Rindoks A., and E. Daniłowicz (2008). "International science careers survey: staying a step ahead". *N Biotechnol*, 25(2-3), 125. https://doi.org/10.1016/j.nbt.2008.08.008)

[8] Stricker, E.M. (2015). "Distinguished career award: Reflections on a career in science". *Physiology and Behavior*, 162, 196-200. http://dx.doi.org/10.1016/j.physbeh.2015.09.028

[9] Verma, I.M. (2004). "The long path to a career in science". *Molecular Therapy*, 9(3), 311, https://doi.org/10.1016/j.ymthe.2004.02.001

[10] Bogdanov, S.A. and L.B. Vyatkina (2017). "The manifestation of the personal characteristics of military high school teachers in career advancement". *Higher Education Today*, 6, 45-47.

[11] Vinokurova, O.S. (2018). "Prospects for higher education against the background of the third wave of social development". *Human Capital*, 117, 27-36.

[12] Gluzman, N.A. and N.V. Gorbunova (2017). "*Professionalism of a Teacher: Success and Career*": Nauka, Yalta.

[13] Statistical Yearbook of Russia (2018). Moscow: Rosstat, 694 p. http://www.gks.ru/free_doc/doc_2018/year/year18.pdf (accessed February 21, 2019).

[14] Sokolova, A.S., Sergeeva, M.G. and I.S. Samokhin (2018). "On the issue of building a professional career of a university teacher in the Russian Federation". *Scientific Dialogue*, 3, 304-318.

[15] Shchepkina, N.K. (2017). "Studying the professional and personal growth and career aspirations of university teachers". *News of Amur State University. Series: Human Sciences*, 76, 78-81.

Development of Business Model In SMEs of Ship Component to Improve Competitiveness

Ampala KHORYANTON[1], PRATIKTO[2], Sudjito SUPARMAN[2], Purnomo Budi SANTOSO[3]

[1]Corresponding author, Ph.D. student at Brawijaya University, Malang, Indonesia, Assistant Professor at Department of Mechanical Engineering, Politeknik Negeri Semarang, Indonesia; E-mail: ampala.khoryanton@gmail.com
[2]Professor at Mechanical Engineering Department, Faculty of Engineering, Universitas Brawijaya, Malang, Indonesia
[3]Associate Professor at Mechanical Engineering Department, Faculty of Engineering, Universitas Brawijaya, Malang, Indonesia

Abstract

The purpose of this study is to provide an overview of SMEs of Ship Component's current business model, describing Strengths, Weaknesses, Opportunities, and Threats based on the canvas business model and providing input on corrective action for the company. The research method is done with the business model approach of canvas, benchmarking analysis and SWOT analysis to form an alternative strategy. The result of this research is the improvement of the business model on nine elements of the Business Model Canvas and there are seven main improvement programs for the company as follows: Establishing new customer segmentation, cooperation with Indonesia Ship Components Industry Association, business partner and supplier of raw materials, forming sub-section of research and development as well as recruiting potential human resources.

Keywords: *SMEs of ship component; business model canvas; SWOT.*

1. Introduction

The role of ships for Indonesia is very important as a trigger for economic development and inter-island liaison. In line with the Indonesian government program in realizing the sea toll program and as the ruler of the world maritime axis, the needs of ships will increase rapidly and shipbuilding industry will be an important foundation in supporting the program. However, the development of the shipbuilding industry in Indonesia is still hampered by the presence of ship components that most still have to import. As many as 70% of ship components must be imported from abroad (Kemenperin, 2016). Ideally, the ship component industry in Indonesia amounts to about 200 units. Currently only available less than 100 units, so Indonesia still needs about 100 units again with a large investment in order to meet economies of scale. The production capacity is ideally about 10 components for each type per month (AIKKI, 2016).

While the condition of SMEs of Ship Component as the main supporting shipbuilding industry in Indonesia can be said is still very weak, indicated by low product quality, less competitive price, lack of information access, especially market information (Khoryanton et al, 2016). This is an obstacle in terms of marketing its products, because with limited access to market information resulting in low market orientation and weak competitiveness at the global level. the failure of companies unable to cope with market competition is due to their focus on environmental factors and change factors and ignores the importance of building a robust business model (Malhotra and Yogesh, 2005). The failing company tends to emulate another company's business model without providing any further adjustments. Though each company has a unique character that requires a separate business model.

Business models can be defined as architectures for products, services and information systems, including descriptions of business actors and regulations, potential benefits for the various actors in it and sources of income (Timmers, 1998). This model is designed to be used as a tool to take advantage of opportunities (Mäkinen and Seppänen, 2007). Business model concepts are used as a common way to explain how firms interact with suppliers, partners, and customers (Zott and Amit, 2007). Similarly, the concept of business model has been positioned between inputs used by firms to obtain an economic output (Afuah, 2004) (Osterwalder, 2004). A business model illustrates the idea of how an organization creates, delivers and captures the values of a business. The concept of a business model must be simple, relevant, and intuitively understandable by not aiming to simplify the complex corporate functions (Osterwalder, and Pigneur, 2010).

Therefore, in order to compete and win a business competition, SMEs of Ship Component should pay more attention to the process of designing business models. Companies must constantly develop and adapt their business models (Wirtz et al, 2010). Well-designed business models will ensure harmonization between strategy, business processes, and information systems. In today's digital economy, it should even be reviewed continuously to ensure it with a complex, uncertain and rapidly changing (Morris et al, 2005)(Al-Debei and Avison, 2010). The business model itself is a source of potential competitive advantage, new things presented by the new business model can result in better value creation or value than ever before. To ensure the success of a company, it takes a unique business model to fully realize the commercial potential of the product (Zott at al, 2011).

Based on the above description of the problem, the main objective of this research is to develop a business model strategy to improve the competitiveness of the Small Medium Industries Ship of Component in Indonesia. The design of the strategy refers to the canvas business model by identifying the current business model. Then perform benchmarking analysis to compare all aspects of business, product, and process to similar competing companies such as Small and Medium Industries of Ship Component. Some of its products are already certified.

Followed by SWOT analysis of internal and external factors of the company, the result is an improvement of the business model and forming a new business model for SMEs of Ship Component.

2. The Methodological Framework

In this research, the method used is a descriptive method with case study approach. The descriptive research method is used to obtain a description of information, explanations, and conditions related to research objects factually accurate and systematic. This study uses a business model approach canvas, benchmarking analysis and SWOT analysis on each element business model canvas.

Required data are data about of existing condition SMEs of Ship Component, data about strengths, weaknesses, opportunities, and threats. The data were obtained through observation, interview, and FGD and questionnaire distribution to respondents.

2.1. Determination Technique of Respondents

Determination of respondents is done by non-probability sampling that is choosing respondents who have experience or competence in a field. The selection of respondents is done intentionally (purposive sampling) with the consideration of respondents have a skill and competent skilled in their field. Respondent is the director and owner of SMEs of Ship Component. There are 30 SMEs of Ship Component concentrated in Tegal Regency, Central Java, Indonesia (Khoryanton et al, 2016). There are two SMEs of Ship Component groups, which are 27 SMEs of Ship Component whose products have not been certified ($SMEsoSC_1$) and SMEs of Ship Component are partly certified ($SMEsoSC_2$).

2.2. Data analysis technique

Processing techniques and data analysis are done as follows: (a) Business model analysis on $SMEsoSC_1$, describes the business condition of the company model at the moment. The analysis is done using the help model business canvas with nine supporting elements. (b) Analysis of benchmarking. The analysis done is to compare all aspects of business, products, and processes that affect performance and quality (Lankford, 2000). (c) SWOT Analysis (Strength, Weaknesses, Opportunity, Threat). In this analysis, the nine elements of BMC will be analyzed using the SWOT method. The results of external and internal factors derived from the nine elements of BMC will result in the formulation of a good improvement model for the company. Internal and external factors were obtained from interviews conducted while conducting documentation studies. (d) The results of the SWOT will result in improvements in the business model as well as forming a new business model for the company. The company may use new or improved business models, but if the company does not want to use the new business model because there are some internal and external constraints then the model can be used at any time by the company if needed. (e) Improvement of the new business model. The next step is to make improvements from the nine elements of the business model. (f) Formulate the stages of implementation of program improvement.

$SMEsoSC_2$ is recommended by the Indonesian Ministry of Industry as a working model (good practice) for the development of the ship component industry in Indonesia (JICA, 2016). Currently, $SMEsoSC_2$ not only focuses on production, but also the development of human resources and product products have standard quality. $SMEsoSC_2$ is used as a benchmark for $SMEsoSC_1$ because it is able to maintain product quality and expand its business to foreign countries. The main purpose of using $SMEsoSC_2$ as a benchmark is to identify and replicate the best activities so as to develop its business (Zairi, 1998). for example with increased productivity, improved design, and creating new (Legner et al, 1997) (Steven et al, 2003). In addition, using the company $SMEsoSC_2$ as a benchmark company the company is expected to meet and exceed the company (Pryor and Katz, 1993).

The results of the benchmarking analysis are used to support components within the company's internal factors. Stages of benchmarking done (Andersen and Pettersen, 1995), namely: (a) Plan. Performing performance period assessments that have been running and determine the performance of companies that will be compared with the selected company into a benchmark performance of the company. (b) Search. Seeking potential companies as partners to benchmark. (c) Observe. Gathers various information about the key success factors of a company that has superior performance as a benchmark for company performance. Identifiable examples such as trending conditions or company product ordering data (Stapenhurst, 2009). (d) Analyze. Analyze the information that has been collected from the selected company as a performance reference. The analysis is done in combination with supporting science so as to strengthen the planned improvement (Stapenhurst, 2009). The analysis is done in combination with other research methods so as to generate an alternative strategy for enterprise business development. (e) Adapt. Develop and implement a company performance improvement program.

Explanation of each business element is as follows: Customer segments are set based on the company's strategic business unit (Bak and Ozlem, 2011) (Betz and Frederick, 2002). The customer is the main target that the company wants to develop the business, therefore it needs customer segment identification target. value propositions, which are the values the organization offers to customer segments. Values of uniqueness both on the products offered. Companies can also target customer segments to be willing to accept the value propositions offered. Channels, explains how companies interact and communicate with both consumers and business partners. In this section, companies will be affected by key resources, key activities, and key partners. Customers relationship explains how the company deals with old customers and also interacts and captures potential customers.

After the new business model is obtained then the next step is the implementation phase of business model improvement. Furthermore, FGD method to formulate the implementation improvement of the business model so it can know the goals, targets, future plans, and improvements that must be done by the company.

3. Results and discussion

3.1. Identification of Business Model Elements of $SMEsoSC_1$

The description of the existing condition of $SMEsoSC_1$ can be modeled as shown in Figure 1 on the nine elements of the business model canvas. Customer Segments, $SMEsoSC_1$ is located in the northern coastal area of Java where there are lots of ship component stores and shipbuilding industries, so the target customer segment is the Ship Components and supplier ship component store. $SMEsoSC_1$ has not been able to supply its products to the shipyard industry because in terms of quality and quantity of products have not been eligible. The value proposition, $SMEsoSC_1$ is Selling ship component product with competitive price. The intense competition between SMEs of Ship Component in one region causes the price of certain types of ship components to decrease in impacts on the decreasing quality as well.

Channels, to be able to interact with customers $SMEsoSC_1$ sells its products in the showroom and trade show. Customers relationship, Corporate strategy in maintaining customer relationships with a personal approach directly to business consumers. Revenue streams, the main revenue source earned through the

<table>
<tr><th>Key Partnership</th><th>Key Activities</th><th>Value Proposition</th><th>Customers Relationship</th><th>Customer Segments</th></tr>
<tr><td rowspan="3">Suppliers of raw materials, partner SMEs, cooperatives, ship component suppliers, and ship component stores</td><td>Supply of raw materials, production, quality control, and packaging</td><td rowspan="3">Selling ship component product with competitive price</td><td>Direct personal approach to business consumers</td><td rowspan="3">Stores of equipment Ship Components and Supplier of ship components,</td></tr>
<tr><td>Key Resources</td><td>Channels</td></tr>
<tr><td>Competent human resources, machine or production equipment, workshop</td><td>Showrooms, and trade shows</td></tr>
<tr><td colspan="2">Cost Structure</td><td colspan="3">Revenue Streams</td></tr>
<tr><td colspan="2">Employee salaries, office operations, workshop operations, capital leases, and debts, manufacturing partners</td><td colspan="3">Sales of ship component products</td></tr>
</table>

Figure 1. The business model canvas of existing condition $SMEsoSC_1$

sale of ship component products. key resources, physical assets owned by $SMEsoSC_1$ to support the production process are competent human resources, workshop, machine and production equipment such as lathe, milling machine, grinding machine, drilling machine, welding machine, casting furnace, etc. However, the machine and production equipment are old and have low accuracy. key activities, activities undertaken by the company related to production are the provision of raw materials, production, quality control, and packaging. key partnership, to optimize the allocation of resources and activities in key partnerships: Suppliers of raw materials, SMEs partners, cooperatives, and ship component suppliers. cost structure, costs incurred in the company's operations include employee salaries, office operations cost, workshop operations cost, lease and debt capital cost, manufacturing partners cost.

3.2. Identify $SMEsoSC_2$ Benchmarking

In order to enter the global market, $SMEsoSC_2$ needs to ensure standardized production in order to obtain ship component product certificates from an authorized accreditation body. The certificate of the Indonesian Classification Bureau class is an important requirement for the ship component industry players to be able to supply to the Indonesian shipyard industry. $SMEsoSC_2$ successfully obtained a certificate from by the Bureau of Classification of Indonesia through local industry development platform in technical cooperation project between the Ministry of Industry and JICA. The products of $SMEsoSC_2$'s flagship product components that have been certified by the Bureau of Classification of Indonesia are side scuttle aluminum cast 333, small ship steel weathertight door class C and D nominal 1050-14660 JIS F2332, JIS marine hose bronze cast connection, and square window.

$SMEsoSC_2$ has successfully certified ship component products from the Indonesian Classification Bureau through several stages, namely (1) Socialization of Indonesian Bureau of Classification standards, the objective is to introduce the standard certification of class ship components of the Indonesian Classification Bureau and refer to how to obtain certification (2) Technical drawing workshop, to improve the human resources of the design field in order to prepare the engineering drawings of ship components that must be approved by the Indonesian Bureau of Classification, (3) Preparation of prototype and test specimens, the objective of providing technical guidance of field by local experts in the manufacture of products, mechanics, material composition and product performance, (4) Laboratory testing of prototypes and specimens, aiming to facilitate laboratory testing processes and provide advice for continuous improvement to meet the required norms, (5) Preparation of quality documents, the purpose of providing training and assistance in the preparation of quality system documents on the intended ship component product, (6) Submission of requirements and test results documents to the Indonesian Bureau of Classification, the purpose of the audit process of the requirements and test results to issue product test certification.

Lessons learned from this process, for the development of a local industry that requires certification. Institutions with authority such as Indonesian Bureau of Classification should be encouraged to coordinate from the beginning so as to provide strong guidance to local industry, but for stronger cooperation should be made a memorandum of understanding between various related parties, especially with the Indonesian Bureau of Classification. $SMEsoSC_2$'s success in obtaining certification is a strategic first step to enter the global market. Currently, $SMEsoSC_2$ has successfully supplied products of certified ship component products to various shipyards spread across Indonesia. Product marketing is done through a business meeting, exhibition and promotion directly to the shipyard.

The products produced by $SMEsoSC_2$ have standard quality. The company pays great attention to using standard raw materials and other supporting materials. The raw material of casting is ingot standard which has been formulated based on the research of experts who have the competence in their field, so as to produce the final product with the standard quality.

Human resources owned by $SMEsoSC_2$ are those that have superiority and expertise in the design of ship component products, metal casting, machining, and welding. Human Resource training and development is always done according to company needs.

$SMEsoSC_2$ has workshops that already implement the 3S principles (Sort, Set in order, and Shine). Sufficient production facilities such as crucible casting furnace, lathe, milling machine, grinding machine, powder coating, compressor, oven, Arc, TIG, MIG machine, drilling machine, copy cutting, electric cutting, electric bending machine, bending manual machine, and hydraulic bending machine. Quality control aspect is an important point for the company. Quality control will check and test each product that has been produced in accordance with the standards set. The existence of quality control can ensure that the design benchmarks, elements of resilience and security elements of products have been met.

3.3. Analysis of SWOT Business Model Canvas

Based on the SWOT analysis on nine elements of the canvas business model, as shown in table 1. The next step is to take actions that can support the company's business development.

Elements of business	Strength	Weakness	Opportunities	Threat
Customer segment	The largest segment comes from business consumers of shipbuilding projects	- Not yet able to sell his products to the shipyard. - No focus on import sales	- Increasing the number of ships in Indonesia - Government policy on the priority of domestic component product usage - Target new consumers to the world	loyalty In business consumers shipbuilding projects are very vulnerable to change
Value Proposition	Quality product with low price	- The product has not been certified - Limited production capacity - Production quality is difficult consistent	- Improved product quality and certification - Increased production capacity - Increasing the number of variations of ship components	- Enforcement of product standardization - The emergence of counterfeit / substitution products

Channel	Companies follow offline and online media	Online and offline media that are used to sell products to consumers is still waiting	- Internet media increasingly sophisticated to be used for media marketing - Support from the government	- Tight competition is available online and offline - The product is easy in imitation
Customer Relationship (CR)	direct personal approach to business project consumers	CR unavailability for retail consumers	The use of information technology is still wide to form CR	The absence of CR causes consumers to switch to other competitors
Key Resources	labor has different skills	- labor is not much - equipment/machine results are not accurate	machines/equipment are abundant and affordable	- suppliers tend to raise the price of raw materials - Migration experts
Key Partnership	- Partnership with suppliers of raw materials is well established - Partnerships with similar SMEs reduce operating costs	- the number of orders from suppliers exceeds production capacity - Consumer and enterprise relationships are limited	Cooperation with $SMEsSC_2$ for standardized products	- Low pricing capability - Courier limits the number of shipments
Revenue Streams	The sources of income vary and some are periodic	When one business unit runs it tends to be another stagnant unit	Revenues are for high new products	high costs for procuring new products
Key Activities	Dynamic and open minded	The high cost of QC	Can look for alternative QC	The cost is relatively high in the future
Cost Structure	The company is able to perform cost efficiency	Working capital is still privately owned	There is an opportunity to add revenue sources	The emergence of high operational costs in the future

Table 1. Analysis of SWOT

3.4. Improved Business Model Canvas $SMEsoSC_1$

Improvement of business model canvas on $SMEsSoC_1$ can be done with the help of SWOT analysis in each element. With the SWOT analysis will be found good prospects for companies that must be maintained and developed, and also the constraints faced by the organization and how the solution to fix it. As shown in Figure 2.

<table>
<tr><th>Key partnership</th><th>key activities</th><th>Value proposition</th><th>Customers relationship</th><th>Customer segments</th></tr>
<tr><td rowspan="3">Suppliers of raw materials and production equipment, partner SMEs, cooperative units, ship component suppliers, courier, investor/banking, Standardization Agency, Testing, and Training Agency</td><td>Provision of standard raw materials, R & D areas of production and quality control and packaging</td><td rowspan="3">Sell certified and noncertified ship component products at competitive prices</td><td>direct personal approach and through information technology for business consumers</td><td rowspan="3">Shipbuilding in the country and abroad, Supplier of domestic and overseas ship components</td></tr>
<tr><td>Key resources</td><td>Channels</td></tr>
<tr><td>Competent human resources, machinery/production equipment, and quality control, workshop and product certification</td><td>showroom, business meeting, internet (online), and trade show</td></tr>
<tr><th colspan="3">cost structure</th><th colspan="2">Revenue streams</th></tr>
<tr><td colspan="3">Employee salaries, raw material costs, certification fees, office, and workshop operating expenses, lease and debt costs, manufacturing partner costs</td><td colspan="2">Sales of certified and non-certified ship components</td></tr>
</table>

Figure 2. Improved business model canvas SMEsoSC1

3.5. $SMEsoSC_1$ Canvas Business Model Improvement Program

After improving the business model in accordance with the SWOT analysis in the nine elements of the canvas business model, the next step is to make alternative program recommendations that can be used by the company to support the improvement program of the company's canvas business model.

Establish a new segmentation of domestic shipyards and overseas shipyard customers because the largest segment comes from the business customers of shipbuilding projects (customer segments). This program can be conducted by certifying the ship component product that is needed in accordance with its class. Certification activities are one way to ensure that the products/services produced to meet the prescribed standards and meet other normative documents or ensure that a company in the production of its goods has implemented the requirements of internationally accepted quality management system standards (Santos et al, 2011). Because standardization is one of the technical regulatory instruments used to protect the interests of consumers and producers (Ungan and Mustafa, 2006). Ships sailing in Indonesian waters can use the regulations of the Bureau of Classification of Indonesia. In addition to the Bureau of Classification of Indonesia in Indonesia itself is not uncommon to use foreign classes for a ship. The classes commonly used by ships in Indonesia include LR (Lloyd Register), BV (Bureau Veritas), RINA (Registro Italiano Navale), GL (Germanischer Lloyd), and ABS (American Bureau of Shipping).

$SMEsoSC_1$ cooperates with $SMEsoSC_2$, Ministry of Industry, Indonesia Classification Bureau and Indonesian Shipbuilding Components Industry Association to establish ship component community and customer service on its website (Customer relationships). Working with business partners to create a website, according to (Kim et al, 2012) that media marketing is one of the vital tools in a good business and is a supporter of the life cycle of a product. Today, information technology is a very important part and greatly affect the world of marketing so it is important for every company to use the Internet as a medium to introduce and sell its products to the public. The company has so far paid less attention to consumers directly because of its more media partner in selling its products. Through the improvement of the website then the development of information systems can be integrated well. Formed a subdivision of Research and Development in the field of casting, machining, assembling and quality control (Key activities). Recruiting potential human resources and working with business partners provides specialized training for company employees (key resources).

Cooperate with suppliers of raw material sources, couriers, investors, and key competent experts (key partnerships). Companies should begin to focus on finding courier partners who are willing to cooperate with ship component products, especially for retail business customers. Companies can make

an agreement that can bind and benefit both. At this stage, the company needs a courier refund that is able to deliver the goods on time and without any defects in the goods. In addition, at this stage, the company also began to search for suppliers of quality machine and tool resources but has a competitive price so that the quality or suitability of raw materials with components of ship products can be standardized.

3.6. Implementation Stage of SMEsoSC$_1$ Canvas Business Model Improvement Program

In general, the stages of program implementation is divided into four stages, namely:

(1) **Preparatory stage**. At this stage, the company plans budgeted costs and determines who will be responsible for the improvement program undertaken. At this stage, the company needs to socialize the program with the external and internal company and prepare everything related to the ship component product certification. There are several work programs that must be prepared, namely: a) rearrangement workshop layout and application of 3K principles to improve the quantity and quality of its production, b) compile and create a quality document for the implementation of product quality control more systematic, c) related to obtaining approval from an authorized accrediting agency, d) Establish prototypes and test specimens in accordance with the requirements requested, either mechanical, material composition or product performance required

(2) **Repair program**. There are four job improvement programs that can be done by the company at this stage: a) Establishing new market segmentation of domestic shipyards and overseas shipyard customers b) SMEsoSC$_1$ in cooperation with SMEsoSC$_2$, Ministry of Industry, Indonesia Classification Bureau and Indonesian Shipbuilding Components Association to establish a community of ship components and customer service on its website, c) Cooperate with business partners to create a personal website, and d) Cooperate with the supplier of the standard raw material source, courier, investor, and competent experts in their field.

(3) **Advanced improvement program**. There are four job improvement programs that can be done by the company at this stage: a) Registering ship component company's products to BKI or other class, b) Establishing subdivision of Research and Development in casting, machining, assembling and quality control, and c) Recruiting human resources who are potential and working with business partners to provide specialized training for company employees.

(4) **The final stage** is the evaluation of the whole program. At this stage, the company must measure and evaluate the improvement program that has been run by the company for three years. If there are shortcomings or obstacles that occur during the program run, then at this stage the company began to refine the business model that has been run. Every step undertaken by the company is fully controlled by the responsible party. Evaluation is carried out to determine whether the stage is experiencing barriers or not. Evaluation of each stage is different in functionality with the final stage, wherein this final stage the company will make improvements to the business model based on the performance improvement program and external changes that occurred at that time.

4. Conclusions and recommendations

The competitive and competitive business model of Small and Medium Enterpraises of Ship Component must have nine business elements, consisting of a) customer segmentations from domestic and overseas shipbuilders, ship component suppliers or vendors, b) value propositions Selling ship component products certified and non-certified at competitive prices, c) channels using media partners from trade shows, business meetings, social media, media coverage, websites, retail stores, d) corporate customer relationships using direct personal approach and through information technology for business consumers, f) revenue streams are derived from the sale of certified and non-certified ship components, g) key resources are competent human resources, machinery or production equipment, quality testing machines, workshops, and certificates, h) key activities undertaken by the company is the provision of raw materials standard, product research and development, design, production, quality control and packaging, i) key partnerships in partnership with standard raw material suppliers, suppliers of production equipment, partner SMEs, cooperatives, ship component suppliers, couriers, investors, certification institution, testing laboratories and training institutes and, j) cost structures issued by firms consisting of employee salaries, raw material costs, certification costs, office operations and workshops, capital leases and debts, manufacturing partners.

There are seven improvement programs that have been prepared, among others a) Establishing new market segmentation of domestic shipyards and overseas shipyard customers b) The company cooperates with SMEsoSC$_2$, Ministry of Industry, Indonesia Classification Bureau and Indonesian Ship Components Industry Association to form the community of ship components and customer service on their website, c) Cooperate with business partners to create a personal website, d) In cooperation with suppliers, couriers, investors, and competent experts e) Registering ship component company products certified and non certified to Indonesia Classification Bureau or other classes, f) Establish R&D subdivisions in production and quality control, and g) Recruit potential human resources and provide specialized training for company employees.

5. Suggestion

It is expected that in the next study, a five porter analysis will be conducted that will analyze the company's condition against other companies. In addition, it is expected that the analysis of revenue streams and cost structure is more comprehensive because in this study is not explained in both segments of consumers that provide greater benefits and greater risks so that the cost of the company is greater than the others.

References

[1] Afuah, A. (2004). *Business models: A strategic management approach*. McGraw-Hill Higher Education.

[2] AIKKI. [online]. http://www. aikki-iscia.org/ (Accessed 02 December 2016).

[3] Al-Debei, M., & Avison, D. (2010). 'Developing a unified framework of the business model concept'. *European Journal of Information Systems*, Vol.19, 359-376.

[4] Andersen, B., & Pettersen, P. G. (1995). '*Benchmarking handbook*'. Springer Science & Business Media.

[5] Bak and Ozlem (2011), 'The Role of Qualitative Research in a Mixed Methods Study-Assessing the e-Business Enabled Transformation in a Strategic Business Unit'. *Qualitative Research Journal*. Vol. 11, No. 2, pp. 76-84.

[6] Betz and Frederick. 2002. 'Strategic business models'. *Engineering management journal*. Vol.14 No.1. pp 21-28.

[7] JICA (2016). '*SME Development Project through Improved Service Provision in Indonesia*'. Final Project Report Jakarta: Ministry of Industry of the Republic of Indonesia

[8] Kemenperin [online). http://www.kemenperin.go.id/ (Accessed 06 December 2016)

[9] Khoryanton, A., Pratikto, S. S., & Purnomo Budi, S. (2016). 'The Analysis of The Level of Technology Contribution to Determine the Strategy of Quality Standard Achievement in the Small and Medium Enterprise of Ship Components'. *Journal of Engineering and Applied Sciences (JEAS)*, Vol.11 No.17, pp.1819-6608

[10] Kim, Angella J., and Eunju Ko. (2012). 'Do social media marketing activities enhance customer equity? An empirical study of a luxury fashion brand". *Journal of Business Research*. Vol. 65. No.10. pp.1480-1486.
[11] Lankford, W.M. (2000). 'Benchmarking: understanding the basics'. *The Coastal Business Journal*. Vol.1 No.1, pp.57-62.
[12] Legner, C., Muscter, S., Brecht, L., Osterle, H. (1997). '*Process measurement and Benchmarking: the Sap Process Information System*'. Swiss (CH): University St. Gallen.
[13] Mäkinen, S., & Seppänen, M. (2007). 'Assessing business model concepts with taxonomical research criteria: A preliminary study'. *Management Research News*, Vol.30. No.10, pp.735-748.
[14] Malhotra, Yogesh (2005). 'Integrating knowledge management technologies in organizational business processes: getting real-time enterprises to deliver real business performance', *Journal of knowledge management*, Vol.9. No.1. pp.7-28.
[15] Morris, M., Schindehutte, M., & Allen, J. (2005). 'The entrepreneur's business model: Toward a unified perspective'. *Journal of Business Research*, Vol.58, pp.726-735.
[16] Osterwalder, A. (2004). '*The business model ontology. A proposition in a design science approach*'. Universite de Lausanne, Lausanne.
[17] Osterwalder, A., & Pigneur, Y. (2010). '*Business model generation: A handbook for visionaries, game changers, and challenges*'. USA: Wiley.
[18] Pryor, L.S., Katz, S.J. 1993. '*How Benchmarking Goes Wrong (And How To Do It Right)*'. England (UK): Emerald Group.
[19] Santos, Gilberto, Fátima Mendes, and Joaquim Barbosa (2011). 'Certification and integration of management systems: the experience of Portuguese small and medium enterprises'. *Journal of cleaner production*. Vol.19. No.17. pp.1965-1974.
[20] Stapenhurst, T. (2009). '*The benchmarking book*'. Routledge.
[21] Steven, T.H., Wouter, T.H., Frans, S. (2003). *'Key Management Models: The Management Tools and Practices that will Improve Your Business'*. London (GB). Prentice Hall.
[22] Timmers, P. (1998). 'Business models for electronic markets'. Electronic markets. *The International Journal on Networked Business*, Vol.8. No.2. pp.3-8.
[23] Ungan, Mustafa C. (2006). 'Standardization through process documentation'. *Business Process Management Journal*. Vol.12. No.2. pp. 135-148.
[24] Wirtz, B., Schilke, O., & Ullrich, S. (2010). 'Strategic development of business models: Implications of the Web 2.0 for creating value on the internet'. *Long Range Planning*, Vol.43. pp.272-290
[25] Zairi, M. (1998). '*Benchmarking for best practice: continuous learning through sustainable innovation*'. Routledge.
[26] Zott, C., & Amit, R. (2007). 'Business model design and the performance of entrepreneurial firms'. *Organization Science*, Vol.18. No.2. pp.181-199.
[27] Zott, C., Amit, R., & Massa, L. (2011). 'The business model: Recent developments and future research'. *Journal of Management*, Vol.37. No.4. pp.1019-1042.

Assessment of the Impact of the Social-Economic Environment on the Development of Academic Giftedness of Russian Schoolchildren

K. Borscheva[1], Y. Fedorova[2], N. Borscheva[3], M. Glukhova[4], E. Fedorov[5]

[1]First Moscow State Medical University I.M. Sechenov, Moscow, Russia
[2]First Moscow State Medical University I.M. Sechenov, Moscow, Russia; E-mail: praskovia68@ya.ru
[3]Corresponding author, First Moscow State Medical University I.M. Sechenov, Moscow, Russia; E-mail: borscheva_nl@mail.ru
[4]First Moscow State Medical University I.M. Sechenov, Moscow, Russia; E-mail: miss4@yandex.ru
[5]First Moscow State Medical University I.M. Sechenov, Moscow, Russia; E-mail: gravi888@yandex.ru

Abstract

The article proposes a new methodological approach to the study and assessment of the impact of socio-economic environment on the academic giftedness of Russian students. The assessment of factors of the social and economic environment is carried out, the correlation model is constructed, the key factors influencing academic giftedness of school students are revealed. A regression model reflecting the influence of socio-economic factors on the academic giftedness of Russian schoolchildren in the dynamics from 2000 to 2018 is constructed.

Keywords: *factors of socio-economic environment; academic giftedness; external environment; education.*

1. Introduction

Creating conditions that ensure the identification and development of gifted children, the realization of their potential, is one of the priorities of modern society. Giftedness is a systemic, life-developing quality of the psyche that determines whether a person can achieve higher, extraordinary results in one or more activities compared to other people. Today, most psychologists recognize that the level, qualitative originality and character of the development of giftedness is always the result of a complex interaction of heredity (natural inclinations) and the social environment, mediated by the activities of the child (game, educational, labor). In this case, of particular importance are the child's own activity, as well as psychological mechanisms of self-development of the individual, underlying the formation and implementation of individual talent.

Under the giftedness of the child understand a higher than his peers susceptibility to learning and more pronounced creative manifestations. Giftedness as a system of education of the individual is a coordinator, regulator, stimulator of creative activity, contributes to finding solutions that enable the child to better adapt to the world, the environment, other people, himself. Gifted-this is the most promising group of students, which can not be approached with standard measures, as their training in traditional methods destroys creativity. The most complete disclosure of the potential of gifted and talented children is an urgent task of modern education. Giftedness is distinguished by the breadth of manifestation and type of preferred activity. One of the types of giftedness is intellectual giftedness-the ability to think, analyze, compare facts. Highly gifted children, defined mainly by intelligence tests, make up a very small proportion of the population. The coefficient of mental development of such children is 160-200 points. In some studies, it is assumed to refer to the highly gifted those whose IQ 160-179 points, and to the exceptionally gifted those who have it 180 and above.

A different kind of talent – leadership or social ability. Studies have shown that this type of giftedness requires above-average mental development. There are many definitions of leadership talent, which can be identified common features. The main thing is that it is a certain set of skills of the leader which is necessary for achievement of the purposes decided before. By definition, leadership skills are mostly interpersonal and include flexibility, openness, organizational skills. Leadership requires such personal traits as self-esteem, emotional development, and high moral qualities. Another kind of talent – artistic talent. This kind of giftedness is maintained and developed in special schools, clubs, studios. It implies high achievements in the field of artistic creativity and performing skills in music, painting, sculpture, acting. But one of the major problems is that the school recognizes and respects these abilities.

Musical giftedness is a kind of giftedness that is characterized by the highest and extremely individual manifestation of musical abilities. Indicators of musical talent are brilliant ear for music, phenomenal memory, plastic and well-coordinated motor "apparatus", incredible learning and high performance. We will not dwell on the above types of giftedness. In our study, we will try to assess the impact of the socio-cultural environment on this type of giftedness as academic giftedness.

Academic giftedness is a pronounced ability to learn. This talent is manifested in the successful teaching of individual subjects and is considered more private, selective. In this type of giftedness has a fairly high intelligence, but the foreground is a special ability to learn. Students of this type of giftedness, first of all, are able to brilliantly assimilate information, that is, to learn. Features of their cognitive sphere (thinking, memory, attention), some features of their motivation are such that make the teaching for them easy enough, and in some cases even enjoyable. Students, who are called the pride of the school, often belong to this type of giftedness, which should not be underestimated. It is from these students that wonderful professionals, real masters of their craft, are subsequently obtained.

The academic type of giftedness has its own subspecies: 1) schoolchildren with a broad ability to learn – they easily master any activity, show noticeable success in all school Sciences, 2) schoolchildren who have increased ability to learn are manifested only in one or more close areas of activity (to the exact or, for example, humanities).

The difference between intellectually and academically gifted children is that intellectuals are necessarily independent in thinking – critical, have a need for understanding and comprehension of the world, the ability to independently reach a global, philosophical understanding of complex intellectual problems. And academically gifted students are always geniuses of teaching, they are some kind of brilliant professionals of school and then student work, excellent masters of fast, durable and high-quality assimilation. Academic giftedness is more adaptive, their intelligence serves them to adapt and meet the requirements of the social environment.

One of the most controversial issues concerning the problem of gifted children is the frequency of children's giftedness. There are two extreme points of view: all children are gifted – gifted children are extremely rare. Supporters of one of them believe that almost any healthy child can be developed to the level of the gifted, provided that favorable conditions are created. For others, giftedness is a unique phenomenon, in which case the focus is on finding gifted children, but the influence of the sociocultural environment is not denied.

According to various studies in Russia today from 1-6 percent of gifted children, while in Japan 13%, in the US-25% [1]. The problem of identifying, developing and supporting gifted children in Russian society is very acute. Many experts argue that it is possible to develop academic giftedness if favorable external conditions are created. However, there is no consensus on this issue.

❑ **Purpose of research**

The aim of the study is to assess the impact of the social environment on the development of academic giftedness of schoolchildren in Russia.

❑ **Research problem**

1. Determine the number of gifted students (academic giftedness) in Russia.
2. To collect statistical data on several groups of factors (social, demographic, economic groups of factors) of the social environment that have a possible impact on the academic giftedness of schoolchildren.
3. Build a correlation model, identify the factors that have the greatest impact on the development of academic giftedness of students.
4. Build a regression model.

❑ **The hypothesis of scientific research**

The development of academic talent of Russian schoolchildren is greatly influenced by the social environment. Factors of the social environment can have both positive and negative impact on the academic giftedness of schoolchildren.

2. Methods of research

Giftedness is a complex, multidimensional concept. There are many definitions of giftedness. By giftedness we mean "a qualitatively peculiar combination of abilities, on which the possibility of achieving high results in the performance of a particular activity depends. This is a system, developing during the life quality of the psyche, which determines the possibility of achieving higher (unusual, extraordinary) results" [2]. Giftedness consists of many components, including genetic and social. Theoretical studies of foreign and Russian scientists (N. S. Leites, A. M. Matyushkin, B. Clark, J. Repzulli, S. Reese, etc.) define giftedness as an innate anatomical and physiological feature of the nervous system (makings), which develops in the process of specially organized activities and can manifest itself in different age periods of childhood [3].

Today, the majority of studies aimed at the identification and development of gifted children. In school practice, quite often limited to the assessment of intelligence quotient (IQ), which is determined by psychometric intelligence tests. It is these tests (often together with creativity tests used to measure creativity) that are most often used in the selection of children for classes and schools for the gifted. This ignores the fact that the use of intelligence and creativity tests has a number of limitations. First, most intelligence tests are not designed to detect intellectual giftedness, but for other purposes. The intelligent Wexler scale for children (the original version of the WISC, as well as its domestic modifications) was intended to determine the level of General intelligence (in particular, to identify delays in mental development), The amthauer intelligence structure test (SIT) – for career guidance and professional selection, the differential ability test – DAT) – for predicting academic performance, etc. Only some of the tests provided for the evaluation of the highest possible results: the culturally free Kettell test (CFT-C) and the Raven Progressive matrices test (a-PMR).

It should also be borne in mind that the test data are highly dependent on the testing situation, the emotional state of the child. At the same time, the more gifted a child is, the greater this dependence is. Therefore, psychometric tests do not predict the level of achievement of gifted children. Many intelligence tests measure a specific (private) intellectual ability, i.e. the formation of specific mental operations. Thus, the existing psychometric tests of intelligence, fixing its components, do not affect the links between them, do not evaluate the system of its manifestation. Thus, psychometric tests can be used as one of the many sources of additional information in the evaluation of a gifted child.

Today, the Federal target program "Gifted children" has developed a "working concept of giftedness". In this concept, the leading domestic experts in the field of psychology of giftedness believe that taking into account the specifics of giftedness in childhood, the most adequate form of identification of signs of giftedness of the child is psychological and pedagogical monitoring. Pihologo-pedagogical monitoring, used to identify gifted children, must meet a number of requirements, including "the identification of signs of giftedness of the child not only in relation to the actual level of his mental development, but also taking into account the zone of proximal development (in particular, in conditions of enriched subject and educational environment in the development of individualized learning strategy of the child)"[4], in the context of changes in the external social environment.

3. Materials and methods

This research was conducted using statistical data of the Federal state statistics service, official data of the Federal Treasury, official data of the Federal service for supervision of education and science (Rosobrnadzor), as well as using statistical and economic and mathematical methods.

To determine the number of gifted students in Russia, we used the official data of the Federal service for supervision of education and science (Rosobrnadzor)in the dynamics from 2000 to 2018. Academically gifted students are students who achieve high success in learning, internally motivated to cognitive activity.

We have calculated the percentage of gifted students (academic giftedness) in the dynamics as the ratio of the total number of students who received 100 points in all subjects on a Single state exam to the total number of participants in the exam this year in the dynamics from 2000 to 2018.

The study collected statistical data on the factors of the social environment, which has a direct impact on the development of giftedness. The higher the standard of living, the more economically developed the society, the higher the level of education and the more adults participate in continuous

education and development, the better the social and living conditions, the higher the state spending on education, the more opportunities for the development of gifted children.

During the study, a correlation model was built. 42 factors of the social environment in the dynamics from 2000 to 2018 were used in the construction of the correlation model. The result was the indicator "Gifted students (academic giftedness) to the total number of students, in%".

In the constructed correlation model revealed a close correlation between the resulting indicator and factors such as" Average monthly nominal accrued wages of employees, rubles. "correlation coefficient 0.9;" Public spending on education, billion rubles. "correlation coefficient 0.8;" the Volume of innovative goods and services produced in Russia " correlation coefficient 0.9. Statistical data for the regression model are presented in table 1.

Year	Gifted schoolchild (academic giftedness) to the total number of schoolchild, % [5] (y)	Average monthly nominal accrued wages of employees, rub. [6] (x1)	Government expenditure on education, billion rub. [7] (x2)	Volume of innovative goods (services) produced in Russia, mln. rub. [8] (x3)
2010	0.3	28027	1893.9	25 794 618.1
2011	0.38	32809	2231.8	33 407 033.4
2012	0.42	36450	2588.4	35 944 433.7
2013	0.30	39648	2888.8	38 334 530.2
2014	0.46	42136	3037.3	41 233 490.9
2015	0.64	43408	3034.6	45 525 133.8
2016	0.67	47554	3103.1	51 316 283.50
2017	0.71	51197	3264	57 611 057.8
2018	0.84	55569	3348	59 344 811.00
Correlation coefficient (R)		0.9	0.8	0.9

Table 1. Statistical data for building a regression model

On the basis of the data obtained, we can observe the positive impact of all three identified factors of the social environment on the development of academic giftedness of schoolchildren.

To confirm the influence of the identified factors on the resulting indicator, we have built a regression model (1)

$$y = 0.034 + 1.166x1 + 0.03x2 + 1.15x3 \quad (1)$$

where *x1* – average monthly nominal accrued wages of employees, rub.

x2 – government expenditure on education, billion rub.

x3 – volume of innovative goods (services) produced in Russia, mln.rub.

The resulting relationship can be explained as follows: the growth of family income opens up additional opportunities for the development of children, the opportunity to visit sections, clubs, museums, cultural events, which has a positive impact on the development of giftedness. The increase in public spending on education, equipping schools with modern laboratory and computer classes, material incentives for students to participate and win the Olympics, the creation of educational centers to identify, develop and support gifted children (educational center "Sirius") also has a positive impact on the increase in the number of gifted students. The influence of the third factor "the Volume of innovative goods and services produced in Russia" can be explained by the fact that innovation is based on the idea, creativity and innovation. Parents with creativity teach their children to find original solutions to non-standard problems, to find non-standard solutions to difficult situations. One of the characteristics of the personality of gifted children is the ability to produce original ideas.

4. Conclusion

As a result of research, the correlation model is constructed and the factors having the greatest positive influence on development of academic giftedness of school students in Russia are revealed. The regression model shows the dependence of the number of gifted students in Russia on changes in the factors of the social environment. As a result of the study, the hypothesis was confirmed by practical results. The results can be used in the development of government measures to support gifted students in Russia, creating conditions for the identification, development and support of gifted children in the family and at school.

References

[1] International PISA studies. Electronic resource. https://rosuchebnik.ru/material/issledovaniya-pisa-2018-v-rossii/

[2] Burkatskaya N. In. Gifted children in secondary school. Electronic resource. http://ext.spb.ru

[3] Burkatskaya N. In. Gifted children in secondary school. Electronic resource. http://ext.spb.ru

[4] Electronic resource. http://obrnadzor.gov.ru/ru

[5] Electronic resource. http://www.gks.ru/

[6] Working concept of giftedness. M., 2003. - p. 10.

[7] Indicators of education: 2018: statistical collection / N. In. Bondarenko, L. Gokhberg, N. In.Kovaleva and others; NAT. research. University "Higher school of Economics". Moscow: HSE, 2018. 400 p.

[8] Electronic resource. http://www.gks.ru/

Investigating the Relationship between Person-Organization Fit, Person-Job Fit, and Innovative Work Behavior: The Mediation Role of Organizational Citizenship Behavior

Sri SUWANTI[1], Udin UDIN[2*]

[1]Universitas Islam Sultan Agung, Semarang, Indonesia
[2]Universitas Muhammadiyah Yogyakarta, Indonesia
[*]Corresponding author: Udin Udin; E-mail: udin_labuan@yahoo.com

Abstract

The main objective of this study is to explore the mediating role of organizational citizenship behavior between person-organization fit and person-job fit on innovative work behavior. 134 employees are randomly selected from 200 employees of the Indonesian banking sector. The data analyzes using structural equation modeling (SEM) with Amos 22 software. The results found that person-organization fit and person-job fit are positively related to organizational citizenship behavior and innovative work behavior. In contrast to the expectation, organizational citizenship behavior is not significantly related to innovative work behavior.

Keywords: *person-organization fit; person-job fit; organizational citizenship behavior; innovative work behavior.*

1. Introduction

In the past few decades, consultants and organizational practitioners have been more concerned about innovative work behavior of employees (J. De Jong & Den Hartog, 2010). This is believed to support organizational success. Therefore, organizations always strive to foster and develop innovative work behavior in order to achieve a sustainable competitive advantage (Afsar & Badir, 2017).

Innovative work behavior is very important for the effectiveness and survival of the organization. This is especially true in a rapidly changing organizational environment, where employees think and apply innovative ideas in response to changes in the work environment (Pieterse, Van Knippenberg, Schippers, & Stam, 2010). In this context, employees can help improve organizational performance by using their ability to generate innovative ideas and use them as building blocks to improve products, services, and work processes better (J. P. De Jong & Den Hartog, 2007).

Complex work innovation requires a variety of cognitive and affective efforts from employees to generate interesting new ideas and apply them in their work (Janssen, Van de Vliert, & West, 2004). To achieve this, employees need to spend their time, mind and energy beyond formal requirements job (Young, 2012), and also have person-job fit and person-organization fit (B. Afsar & Y. Badir, 2016; Afsar, Badir, & Khan, 2015a). This is thought to be able to create a higher level of innovative work behavior. Therefore, the purpose of this study is to investigate the effect of (1) person-organization fit on innovative work behavior and OCB; (2) person-job fit on innovative work behavior an OCB; and (3) OCB on innovative work behavior.

2. Literature Review

2.1. Innovative Work Behavior

Innovative work behavior refers to a series of behaviors about the introduction of new ideas that are useful to be developed and implemented with the aim of improving employee performance and also organizational performance (J. P. De Jong & Den Hartog, 2007). Innovative work behavior usually does not only include exploration of opportunities in generating new ideas but also includes behaviors that are directed at implementing change and new knowledge or improving work processes to achieve individual performance and organizational performance (J. P. De Jong & Den Hartog, 2008).

Employees with high innovative work behavior can quickly and precisely respond to the work environment, propose new ideas and provide services and products (Afsar, Cheema, & Bin Saeed, 2018). Therefore, to effectively encourage innovative work behavior in organizations, organizations need to facilitate and support organizational citizenship behavior of employees (Akturan & Çekmecelioğlu, 2016; Barnhill & Smith, 2018; Gerke, Dickson, Desbordes, & Gates, 2017), person-job fit and person-organization fit (B. Afsar & Y. Badir, 2016; Afsar et al., 2015a; Afsar et al., 2018).

2.2. Organizational Citizenship Behavior (OCB)

Tsai and Su (2011) emphasized that the concept of OCB was first proposed by Bateman and Organ in 1983, stating that OCB is free behavior that is not mandated or compensated by the organization. This includes behaviors that play a role in maintaining an organization's social system and indirectly benefit the workgroup or organization as a whole.

OCB is the discretionary behaviors that are not directly or explicitly recognized by the organization's formal reward system, not the implementation of the required roles or job descriptions, and negligence over them is generally not understood as a punishment (Ahmad, 2006). OCB reflects the actions taken by employees that go beyond the minimum role requirements expected by the organization and promote the welfare of colleagues, workgroups and larger organizations (Jehad, Quoquad, Farzana, & Mohmad, 2011).

OCB can be considered as employee behavior in motivating themselves in the organization's social-psychological environment which facilitates the social machinery of the organization (Kamani & Namdari, 2012). OCB can increase openness in

communication, level of cooperation, and willingness to contribute among individual members in organizations that can increase organizational effectiveness (Jain, 2009).

In the theory of social exchange, employees will be involved in OCB when they are treated fairly (Liaquat & Mehmood, 2017), given meaningful and satisfying work (Fathiizadeh, Zare, & Bahmani, 2018), and have a high person-organization fit/ person-job fit (B. Afsar & Y. Badir, 2016; Afsar et al., 2015a; Afsar et al., 2018) so as to produce innovative work outcomes (B. Afsar & Y. Badir, 2016; Naqshbandi, Singh, & Ma, 2016).

2.3. Person-Organization (PO) Fit

Person-organization fit is generally conceptualized as a match between employee values and organizational values (Kristof-Brown, Zimmerman, & Johnson, 2005). Employees are naturally motivated to feel connected with others in the social environment of the organization. The need for relatedness will encourage employees to engage in various activities that are preferred. Employees whose values are in accordance with organizational values will be easier to have a higher relatedness (Greguras & Diefendorff, 2009).

Person-organization fit can enhance the formation of strong relationships and facilitate the exchange of resources between employees and the organization. Employees who have high fit will appear more passionate about the work, so they get greater career opportunities and higher work achievement (Astakhova & Porter, 2015).

Kristof-Brown and Guay (2011) show that employees who have a high degree of appropriateness with the organization will reach a higher position in their organization and also reach a greater level of compensation. This is because they have a higher level of commitment, perform better, and are more effective individuals than others who do not have a level of compatibility with the organization. Furthermore, employees who have a high level of compatibility with the organization more positively contribute to work that exceeds and exceeds the expected work activities (Risman, Erickson, & Diefendorff, 2016).

Person-organization fit can help employees build long-term relationships with organizations, where they tend to display behaviors that have a positive influence on the organization's achievements. Y.-J. Kim, Van Dyne, Kamdar, and Johnson (2013) stated that by selecting employees who have high fit organizations, the organization can manage and grow the creative capital of employees and their creativity.

Good compatibility between employees and organizations tends to encourage creative thinking and support for others to implement innovative ideas, thus making employees more involved in innovative work behavior. Employees with a high level of compatibility with the organization can repay the support and justice shown by the organization by paying for it through positive work behaviors such as innovative work behavior. Afsar and Badir (2017) show that a high person-organization fit helps employees to perform certain behaviors that help drive organizational innovation.

Cooman et al. (2009) stated that by recruiting employees who have value in accordance with the organization, the organization not only provides great opportunities for employees to work, but also encourages an increase in employees who perform well, committed, and satisfied. In the study of Afsar (2016), the person-organization fit was able to improve knowledge sharing behavior among employees, which in turn further encouraged employees' innovative work behaviors. This is also supported by several other results such as (B. Afsar & Y. Badir, 2016; Afsar & Badir, 2017; Sarac, Efil, & Eryilmaz, 2014; Wojtczuk-Turek & Turek, 2016) that person-organization fit increases creative and innovative work behavior of employees. Employees with high fit will be satisfied with their duties and intrinsically motivated so that they display innovative work behavior on an ongoing basis. Thus,

H1: *PO fit is positively related to innovative work behavior*

A high degree of compatibility between employee values and organizational values can lead to positive work attitudes such as job involvement, career success, health and adaptation, and lower stress, and other behaviors that benefit the organization (Caldwell, Herold, & Fedor, 2004). Employees who have value compatibility with the organization, they will feel satisfied with their job, unite with the organization, and strive to maintain working relationships (Kristof-Brown et al., 2005).

The compatibility of values between employees and organizations helps employees to encourage extra-role behavior in making positive suggestions for change in the workplace. Employees whose personal values are more in line with organizational values are able to perform more high OCB (B. Afsar & Y. F. Badir, 2016; Khaola & Sebotsa, 2015). When job characteristics, organizational demands, and availability of resources are in accordance with the capabilities and intrinsic needs of employees, they tend to adjust and respond more creatively to these situations so as to encourage higher levels of commitment and job satisfaction (Kristof-Brown et al., 2005).

Person-organization fit has been identified by many scholars as one of the most important factors affecting OCB (B. Afsar & Y. F. Badir, 2016; Chhabra, 2016; Hamstra, Van Vianen, & Koen, 2018; Jawad, Tabassum, Raja, & Abraiz, 2013; Khaola & Sebotsa, 2015). J. P. De Jong and Den Hartog (2007) assert that employees with good fit feel satisfied with their duties and are intrinsically motivated, and those who are intrinsically motivated will always display OCB, for example helping colleagues who are absent, motivate other people to work effectively and efficiently for the organization, offer interesting ideas to improve organizational functions, show concern for the organization's image, act in a good way that is able to increase morale, and resolve interpersonal conflicts between employees. Therefore,

H2: *PO fit is positively related to OCB*

OCB helps employees overcome times of uncertainty, changes in work environment and scarcity of resources, all of which require an open process of work innovation (Lindegaard, 2010). In particular, by showing sportsmanship, employees increase their willingness to take on new responsibilities or learn new skills to adapt to changes in the existing work environment. A high level of OCB can build employee morale among team members and various organizational units, which leads to a cohesive, supportive, trusting, and more committed work environment (Mirabi & Maghsoodi Ganjeh, 2017; Naqshbandi et al., 2016).

The results of the study found that OCB is effectively able to encourage innovative work behavior in the organization (Akturan & Çekmecelioğlu, 2016; Barnhill & Smith, 2018; Gerke et al., 2017). Therefore,

H3: *OCB is positively related to innovative work behavior*

2.4. Person-Job (PJ) Fit

Person-job fit assumes match or compatibility between employee characteristics and the conditions of their work environment. This compatibility is elaborated through two main dimensions, namely (1) the suitability of the goals and values needed by employees that might be fulfilled by the organization; and (2) compatibility between employee competencies and job requirements. Compatibility includes evaluations that are expressed through affective and cognitive responses, and are related to the extent to which the work provided is beneficial to employees and organizations, resulting in job satisfaction and organizational effectiveness (Kristof-Brown et al., 2005).

Fit theory states that increasing person-job fit can increase the psychological antecedents of work performance, such as satisfaction with the job. Furthermore, job satisfaction at the employee level will have a significant effect at a greater level, namely throughout the organization (Zatzick & Zatzick, 2013).

Chen, Yen, and Tsai (2014) in their study found that person-job fit had a significant effect on total job involvement.

Employees who feel a high person-job fit will be more willing to do their job passionately.

Person-job fit shows that shared values between employees and jobs lead to job satisfaction for employees and leads to achieving organizational goals through OCB (Vilela, González, & Ferrín, 2008). When employees feel that they are compatible with the job and organization, they tend to do the job effectively by involving their role in making the organization's vision and mission successful (Hamid & Yahya, 2011).

The findings of the researchers indicate that person-job fit has a positive influence on employee OCB (C. Boon, DenHartog, Boselie, & Paauwe, 2011; Farzaneh, Farashah, & Kazemi, 2014; Hamstra et al., 2018; Jawad et al., 2013). Employees who are in a work team that has high interpersonal compatibility, they can redefine their work roles and utilize work skills to carry out responsibilities and complete tasks effectively. They also tend to easily receive social support from co-workers in the organization. Thus,

H4: *PJ fit is positively related to OCB*

Person-job fit refers to compatibility between employee abilities and job demands. When employees have the right skills in the work provided, they will be involved in the work with joy, which leads to better work performance. When the person-job fit is high, employees will improve the quality of work because they feel confident that their efforts will bring desired results in the form of organizational rewards (Astakhova & Porter, 2015; Greguras & Diefendorff, 2009).

Employees will interpret work more when they have personal values that are in line with work values, where work is designed as an opportunity to interact with others to produce meaningful work. The works that are characterized by challenging tasks, autonomy, and significance are seen as important for employees who have high person-job fit. When work is in line with the employee's self-identity, then the work becomes more meaningful (Tims, Derks, & Bakker, 2016), so that employees initiate innovative ideas and implement them in their work (B. Afsar & Y. Badir, 2016). Therefore,

H5: *PJ fit is positively related to innovative work behavior*

3. Materials and Methods

3.1. Sample

This study was carried out in the banking sector, which involved employees of *Bank Nasional Indonesia* (BNI), *Bank Rakyat Indonesia* (BRI) and *Mandiri Bank*. These three banking sectors were chosen as sample targets because the three bank employees not only perform innovative work but also have emotional attachments to the facilitated data collection.

By using purposive sampling, the study sample was 134 employees. Furthermore, the collected data was analyzed through structural equation modeling (SEM) with Amos 22 software package.

3.2. Measurement

The indicators of each variable in this study were measured using a five-point Likert scale, where 1 = strongly disagree to 5 = strongly agree.

- *Innovative Work Behavior* (*IWB*). IWB measurement uses 4 indicators adapted from J. De Jong and Den Hartog (2010) (e.g. “I pay more attention to issues that are no part of the daily work”).
- *Organizational Citizenship Behavior* (*OCB*). OCB measurement uses 6 indicators adapted from Lee and Allen (2002) (e.g. “I help others who have been absent”).
- *Person-Organization Fit* (*PO fit*). PO fit measurement uses 4 indicators adapted from Vilela et al. (2008) (e.g. “My personal values match to my organization’s values and culture”).
- Person-Job Fit (PJ fit). PJ fit measurement uses 4 indicators adapted from Cable and DeRue (2002) (e.g. “My abilities fit the demands of this job”).

4. Results

The results of the normality test using structural equation modeling (SEM) with Amos 22 software package can be seen from the value of skewness and kurtosis. It must be fulfilled univariate and multivariate normality. Data could be normally distributed if the critical ratio (CR) value of skewness and kurtosis is in the range of ± 2.58 univariate.

Table 1 shows that univariate normality tests have been fulfilled because the CR values in both skewness and kurtosis are smaller than 2.58. It means that each indicator has skewness and kurtosis which form a normal curve pattern. While the normality test of multivariate, the CR value is 5.869 which is below 10 (Kline, 2015), so it can be concluded that the data is normally multivariate distributed.

Variable	min	max	skew	c.r.	kurtosis	c.r.
IWB4	3.000	7.000	-.412	-2.502	-.281	-.851
IWB3	3.000	7.000	-.342	-2.078	.146	.443
IWB2	4.000	7.000	-.260	-1.576	-.830	-2.519
IWB1	4.000	7.000	-.304	-1.844	-.679	-2.060
OCB1	3.000	7.000	-.224	-1.358	-.721	-2.187
OCB2	3.000	7.000	-.139	-.843	-.622	-1.889
OCB3	3.000	7.000	-.334	-2.026	-.736	-2.232
OCB4	3.000	7.000	-.108	-.653	-.756	-2.293
OCB5	4.000	7.000	-.202	-1.224	-.635	-1.928
OCB6	3.000	7.000	-.195	-1.186	-.575	-1.746
PJ1	3.000	7.000	-.082	-.496	-.051	-.154
PJ2	3.000	7.000	-.206	-1.248	-.172	-.520
PJ3	3.000	7.000	-.297	-1.802	.307	.932
PJ4	3.000	7.000	-.090	-.544	-.528	-1.602
PJ5	3.000	7.000	.044	.266	-.824	-2.500
PJ6	3.000	7.000	.014	.087	-.369	-1.120
PO4	3.000	7.000	-.056	-.342	-.745	-2.260
PO3	4.000	7.000	-.217	-1.316	-.834	-2.532
PO2	3.000	7.000	-.202	-1.227	-.566	-1.716
PO1	4.000	7.000	-.403	-2.445	-.560	-1.701
Multivariate					23.423	5.869

Table 1. Assessment of Normality (N = 134)

			Estimate
PO1	<---	PO_Fit	.697
PO2	<---	PO_Fit	.781
PO3	<---	PO_Fit	.768
PO4	<---	PO_Fit	.658
PJ6	<---	PJ_Fit	.932
PJ5	<---	PJ_Fit	.882
PJ4	<---	PJ_Fit	.950
PJ3	<---	PJ_Fit	.936
PJ2	<---	PJ_Fit	.882
PJ1	<---	PJ_Fit	.903
OCB6	<---	OCB	.927
OCB5	<---	OCB	.909
OCB4	<---	OCB	.933
OCB3	<---	OCB	.931
OCB2	<---	OCB	.923
OCB1	<---	OCB	.944
IWB1	<---	IWB	.841
IWB2	<---	IWB	.892
IWB3	<---	IWB	.791
IWB4	<---	IWB	.931

Table 2. Standardized Loadings (N = 134)

Table 2 shows the loading factor of latent to observed variables is above 0.6. It postulates that the constructs fulfill to convergent validity (Hair, Anderson, Babin, & Black, 2010).

The results of goodness of fit indices analysis show that Chi-Square = 189.843; df = 165, Probability = 0.090; RMSEA = 0.026; CMIN/DF = 1.151; GFI = 0.923; AGFI = 0.902; TLI = 0.994; CFI = 0.995; and NFI = 0.960. These overal values indicate a good fit model.

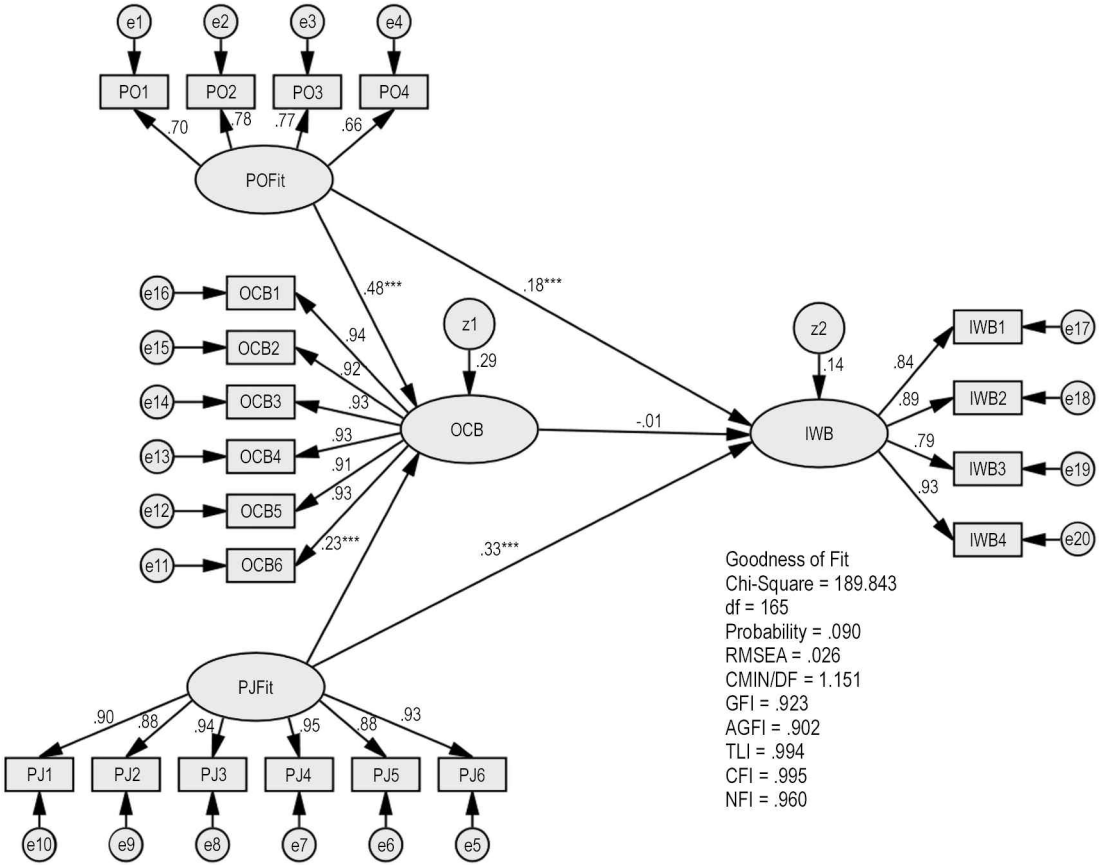


Figure 1. The Proposed Research Model

Path			Estimate (β)	S.E.	C.R.	P	Results
IWB	<---	PO_Fit	.184	.092	2.051	.040	Accepted
OCB	<---	PO_Fit	.482	.113	6.166	***	Accepted
IWB	<---	OCB	-.006	.058	-.071	.943	Rejected
OCB	<---	PJ_Fit	.233	.060	3.668	***	Accepted
IWB	<---	PJ_Fit	.325	.050	4.447	***	Accepted

*Note: *** P < 0.05*

Table 3. Hypotheses Testing Results (N = 134)

Figure 1 and Table 3 show that PO fit is positively related to innovative work behavior (β = 0.184, P < 0.05) and OCB (β = 0.482, P < 0.05); PJ fit is positively related to OCB (β = 0.233, P < 0.05) and innovative work behavior (β = 0.325. P < 0,05). Thus, hypothesis 1, 2, 4 and hypothesis 5 are supported. In contrast, OCB is not significantly related to innovative work behavior (β = -0.006, P > 0.05). Hence, the proposed hypothesis 3 is not supported.

5. Discussion

The concept of PO fit reflects the personality, values, goals, attitudes, and needs of employees that are in accordance with the values, demands, and organizational culture. Matching values between employees and organizations can help them to make meaningful suggestions at work (Werbel & DeMarie, 2005). When employees job characteristics, organizational demands, and availability of resources are in accordance with their abilities and intrinsic needs, they tend to respond more creatively to work situations by showing higher levels of commitment and job satisfaction (Afsar, Badir, & Khan, 2015b; Kristof-Brown, Zimmerman, & Johnson, 2005).

PO fit is also able to encourage motivation, effort, energy, and perseverance, and increase involvement in achieving the organizational mission (Wang, Zhan, McCune, & Truxillo, 2011). In addition, the suitability of employee and organizational values can facilitate the exchange of information between employees (Corine Boon & Biron, 2016), thus influencing OCB. This is in line with the findings of previous researchers who stated that PO fit is the most important factor affecting OCB (B. Afsar & Y. F. Badir, 2016; Chhabra, 2016; Hamstra et al., 2018; Jawad et al., 2013; Khaola & Sebotsa, 2015).

PJ fit focuses on the individual level and ensures that employees have the technical expertise to do mandated work and make value-added contributions (Werbel & DeMarie, 2005). The compatibility between employee perceptions of job assignments and the situations in which they work and their personal preferences affect the results of positive work creativity (T.-Y. Kim, Hon, & Crant, 2009). Afsar et al. (2015b); Afsar et al. (2018); B. Afsar and Y. Badir (2016) prove that PJ fit plays an important role in influencing innovative work behavior of employees.

PJ fit becomes an important factor in increasing organizational effectiveness. Employees who have a high level of PJ fit are more willing to do their work with enthusiasm, which in turn increases their OCB (C. Boon et al., 2011; Farzaneh et al., 2014; Hamstra et al., 2018; Jawad et al., 2013).

Organizational effectiveness depends not only on employee in-role behavior but also through extra-role behavior in organizations that present innovative and autonomous that go beyond the formal job requirements (Jiang & Cheng, 2003). However, the results of the analysis show that employees, who are employed in cross-functional capacities and are associated with markets or customers, they tend to show low innovative work behavior compared to employees in other divisions. This is caused by the low loyalty and functional participation that employees have towards the organization. This finding was supported by some previous researchers which found that OCB did not have a significant effect on innovative work behavior of employees (Kesen, 2016; Yan & Yan, 2013).

6. Conclusion

This study found that PO fit and PJ fit significantly related to OCB and innovative work behavior. These findings have important implications for banking sector managers to continue innovation and cultivate the innovative work behavior of their employees through PO fit and PJ fit. Managers can try to change their innovative work culture to suit the expected organizational and job context (Sharma & Bhatnagar, 2014).

This study has several limitations. Because of the scope of the study, the authors cannot prove the relationship between OCB and innovative work behavior. In addition, there may be any mediators among these variables that can link OCB and innovative work behavior for future research.

References

[1] Afsar, B. (2016). The impact of person-organization fit on innovative work behavior - The mediating effect of knowledge sharing behavior. *International Journal of Health Care Quality Assurance*, 29(2), 104-122.

[2] Afsar, B., & Badir, Y. (2016). The mediating role of psychological empowerment on the relationship between person-organization fit and innovative work behaviour. *Journal of Chinese Human Resource Management*, 7(1), 5-26.

[3] Afsar, B., & Badir, Y. (2017). Workplace spirituality, perceived organizational support and innovative work behavior: The mediating effects of person-organization fit. *Journal of Workplace Learning*, 29(2), 95-109.

[4] Afsar, B., Badir, Y., & Khan, M. M. (2015a). Person–job fit, person–organization fit and innovative work behavior: The mediating role of innovation trust. *Journal of High Technology Management Research*, 26, 105-116.

[5] Afsar, B., Badir, Y., & Khan, M. M. (2015b). Person–job fit, person–organization fit and innovative work behavior: The mediating role of innovation trust. *The Journal of High Technology Management Research*, 26(2), 105-116.

[6] Afsar, B., & Badir, Y. F. (2016). Person–organization fit, perceived organizational support, and organizational citizenship behavior: The role of job embeddedness. *Journal of Human Resources in Hospitality & Tourism*, 15(3), 252-278.

[7] Afsar, B., Cheema, S., & Bin Saeed, B. (2018). Do nurses display innovative work behavior when their values match with hospitals' values? *European Journal of innovation management*, 21(1), 157-171.

[8] Ahmad, Z. (2006). *Job attitudes as a determinant of organizational citizenship behaviors: A study among academic staffs in Kuching polytechnic*. Malaysia: Sarawak University.

[9] Akturan, A., & Çekmecelioğlu, H. G. (2016). The Effects of Knowledge Sharing and Organizational Citizenship Behaviors on Creative Behaviors in Educational Institutions. *Procedia-Social and Behavioral Sciences*, 235, 342-350.

[10] Astakhova, M. N., & Porter, G. (2015). Understanding the work passion-performance relationship: The mediating role of organizational identification and moderating role of fit at work. *Human Relations*, 7, 1-32.

[11] Barnhill, C., & Smith, N. (2018). Psychological Contract Fulfillment and Innovative work behaviors: The Mediating Role of Organizational Citizenship. *North American Society of Sport Management Annual Conference*, Halifax, Canada.

[12] Boon, C., & Biron, M. (2016). Temporal issues in person–organization fit, person–job fit and turnover: The role of leader–member exchange. *Human Relations*, 69(12), 2177-2200.

[13] Boon, C., DenHartog, D. N., Boselie, P., & Paauwe, J. (2011). The relationship between perceptions of HR practices and employee outcomes: examining the role of person-organisation and person-job fit. *The International Journal of Human Resource Management*, 22(1), 138-162.

[14] Cable, D. M., & DeRue, D. S. (2002). The convergent and discriminant validity of subjective fit perceptions. *Journal of Applied Psychology*, 87(5), 875-884.

[15] Caldwell, S. D., Herold, D. M., & Fedor, D. B. (2004). Toward and understanding of the relationships among organizational change, individual differences, and changes in person-environment fit: A cross-level study. *Journal of Applied Psychology*, 89(5), 868-882.

[16] Chen, C.-Y., Yen, C.-H., & Tsai, F. C. (2014). Job crafting and job engagement: The mediating role of person-job fit. *International Journal of Hospitality Management*, 37, 21-28.

[17] Chhabra, B. (2016). Work role stressors and employee outcomes - Investigating the moderating role of subjective person-organization and person-job fit perceptions in Indian organizations. *International Journal of Organizational Analysis*, 24(3), 390-414.

[18] Cooman, R. D., Gieter, S. D., Pepermans, R., Hermans, S., Bois, C. D., Caers, R., & Jegers, M. (2009). Person–organization fit: Testing socialization and attraction–selection–attrition hypotheses. *Journal of Vocational Behavior*, 74, 102-107.

[19] De Jong, J., & Den Hartog, D. (2010). Measuring innovative work behaviour. *Creativity and innovation management*, 19(1), 23-36.

[20] De Jong, J. P., & Den Hartog, D. N. (2007). How leaders influence employees' innovative behaviour. *European Journal of innovation management*, 10(1), 41-64.

[21] De Jong, J. P., & Den Hartog, D. N. (2008). Innovative work behavior: Measurement and validation. *EIM Business and Policy Research*, 1-27.

[22] Farzaneh, J., Farashah, A. D., & Kazemi, M. (2014). The impact of person-job fit and person-organization fit on OCB - The mediating and moderating effects of organizational commitment and psychological empowerment. *Personnel Review*, 43(5), 672-691.

[23] Fathiizadeh, A., Zare, R., & Bahmani, A. (2018). Getting involved with The Job among nurses and its effect on Organizational Citizenship Behavior: the Mediating Role of Job Satisfaction. *Iran Journal of Nursing*, 30(110), 33-44.

[24] Gerke, A., Dickson, G., Desbordes, M., & Gates, S. (2017). The role of interorganizational citizenship behaviors in the innovation process. *Journal of Business Research*, 73, 55-64.

[25] Greguras, G. J., & Diefendorff, J. M. (2009). Different fits satisfy different needs: linking person-environment fit to employee commitment and performance using self-determination theory. *Journal of Applied Psychology*, 94(2), 465-477.

[26] Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). *Multivariate data analysis: a global perspective*. New Jersey: Prentice Hall PTR.

[27] Hamid, S. A., & Yahya, K. K. (2011). Relationship between person-job fit and person-organisation fit on employees' work engagement: a study among engineers in semiconductor companies in Malaysia. *Annual Conference on Innovations in Business & Management*, London, 1-30.

[28] Hamstra, M. R., Van Vianen, A. E., & Koen, J. (2018). Does employee perceived person-organization fit promote performance? The moderating role of supervisor perceived person-organization fit. *European Journal of Work and Organizational Psychology*, 1-8. https://doi.org/10.1080/1359432X.2018.1485734

[29] Jain, A. K. (2009). Organizational citizenship behavior as a predictor of personal effectiveness and general health. *Academy of Taiwan Business Management Review*, 5(3), 51-61.

[30] Janssen, O., Van de Vliert, E., & West, M. (2004). The bright and dark sides of individual and group innovation: A special issue introduction. *Journal of organizational behavior*, 25(2), 129-145.

[31] Jawad, M., Tabassum, T. M., Raja, S., & Abraiz, A. (2013). Study on Work Place Behaviour: Role of Person-Organization Fit, Person-Job Fit & Empowerment, Evidence from Pakistan. *Journal of Business and Management Sciences*, 1(4), 47-54.

[32] Jehad, M., Quoquad, H., Farzana, A., & Mohmad, A. (2011). Job satisfaction and organisational citizenship behaviour: an empirical study at higher learning institutions. *Asian Academy of Management Journal*, 16(2), 149-165.

[33] Jiang, D., & Cheng, B. (2003). Studies on organizational loyalty, commitment, and citizenship behavior in Taiwan: A critical review. *Research in Applied Psychology*, 19, 175-209.

[34] Kamani, S. M., & Namdari, K. (2012). A Study of the Relationship between Organizational Justice and Support and Organizational Citizenship Behavior. *International Journal of Arts & Sciences*, 5(6), 355–368.

[35] Kesen, M. (2016). Linking organizational identification with individual creativity: organizational citizenship behavior as a mediator. *Journal of Yaşar University*, 11(41), 56-66.

[36] Khaola, P. P., & Sebotsa, T. (2015). Person-organisation fit, Organisational commitment and organisational citizenship Behaviour. *Danish Journal of Management and Business Sciences*, 7, 67-74.
[37] Kim, T.-Y., Hon, A. H., & Crant, J. M. (2009). Proactive personality, employee creativity, and newcomer outcomes: A longitudinal study. *Journal of Business and Psychology*, 24(1), 93-103.
[38] Kim, Y.-J., Van Dyne, L., Kamdar, D., & Johnson, R. E. (2013). Why and when do motives matter? An integrative model of motives, role cognitions, and social support as predictors of OCB. *Organizational Behavior and Human Decision Processes*, 121(2), 231-245.
[39] Kline, R. B. (2015). *Principles and practice of structural equation modeling*, Fourth Edition: Guilford publications.
[40] Kristof-Brown, A. L., & Guay, R. P. (2011). Person-environment fit. In S. Zedeck (Ed.), *APA Handbook of Industrial and Organizational Psychology*. Washington, DC: American Psychological Association.
[41] Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. (2005). Consequences of individuals' fit at work: a meta-analysis of person-job, person-organization, person-group, and personsupervisor fit. *Personnel Psychology*, 58(2), 281-342.
[42] Kristof-Brown, A. L., Zimmerman, R. D., & Johnson, E. C. (2005). Consequences of individuals' fit at work: A meta-analysis of person–job, person–organization, person–group, and person–supervisor fit. *Personnel psychology*, 58(2), 281-342.
[43] Lee, K., & Allen, N. J. (2002). Organizational Citizenship Behavior and Workplace Deviance: The Role of Affect and Cognitions. *Journal of Applied Psychology*, 87(1), 131-142.
[44] Liaquat, M., & Mehmood, K. (2017). Organization Citizenship Behavior: Notion of Social Exchange Theory. *Journal of Business and Social Review in Emerging Economies*, 3(2), 209-216.
[45] Lindegaard, S. (2010). *The open innovation revolution: essentials, roadblocks, and leadership skills*: John Wiley & Sons.
[46] Mirabi, V., & Maghsoodi Ganjeh, Y. (2017). The Link between Organisational Citizenship Behaviours and Open Innovation: A Case of Isfahan High-tech Sector. International Journal of Information, *Security and Systems Management*, 6(1), 649-655.
[47] Naqshbandi, M. M., Singh, S. K. G., & Ma, P. (2016). The link between organisational citizenship behaviours and open innovation: A case of Malaysian high-tech sector. *IIMB Management Review*, 28(4), 200-211.
[48] Pieterse, A. N., Van Knippenberg, D., Schippers, M., & Stam, D. (2010). Transformational and transactional leadership and innovative behavior: The moderating role of psychological empowerment. *Journal of organizational behavior*, 31(4), 609-623.
[49] Risman, K. L., Erickson, R. J., & Diefendorff, J. M. (2016). The Impact of Person-Organization Fit on Nurse Job Satisfaction and Patient Care Quality. *Applied Nursing Research*, 31, 121-125.
[50] Sarac, M., Efil, I., & Eryilmaz, M. (2014). A study of the relationship between person-organization fit and employee creativity. *Management Research Review*, 37(5), 479-501.
[51] Sharma, A., & Bhatnagar, J. (2014). Innovative work behavior: The role of organizational citizenship behavior, transformational leadership and psychological empowerment among knowledge workers in India. Paper presented at the *Global Conference on Managing in Recovering Markets*, MDI, Gurgaon.
[52] Tims, M., Derks, D., & Bakker, A. B. (2016). Job crafting and its relationships with person–job fit and meaningfulness: A three-wave study. *Journal of Vocational Behavior*, 92, 44-53.
[53] Tsai, C., & Su, C. (2011). Leadership, Job Satisfaction and Service-oriented Organizational Citizenship Behaviors in Flight Attendants. *African Journal of Business Management*, 5(5), 1915-1926.
[54] Vilela, B. B., González, J. A. V., & Ferrín, P. F. (2008). Person–organization fit, OCB and performance appraisal: Evidence from matched supervisor–salesperson data set in a Spanish context. *Industrial Marketing Management*, 37, 1005-1019.
[55] Wang, M., Zhan, Y., McCune, E., & Truxillo, D. (2011). Understanding newcomers' adaptability and work-related outcomes: Testing the mediating roles of perceived P–E fit variables. *Personnel psychology*, 64(1), 163-189.
[56] Werbel, J. D., & DeMarie, S. M. (2005). Aligning strategic human resource management and person–environment fit. *Human Resource Management Review*, 15(4), 247-262.
[57] Wojtczuk-Turek, A., & Turek, D. (2016). The significance of perceived social-organization climate for creating employees' innovativeness - The mediating role of person-organization fit. *Management Research Review*, 39(2), 167-195.
[58] Yan, L., & Yan, J. (2013). Leadership, organizational citizenship behavior, and innovation in small business: an empirical study. *Journal of Small Business & Entrepreneurship*, 26(2), 183-199.
[59] Young, L. D. (2012). How to promote innovative behavior at work? The role of justice and support within organizations. *The Journal of creative behavior*, 46(3), 220-243.
[60] Zatzick, C. D., & Zatzick, D. F. (2013). The effect of perceived person-job fit on employee attitudes toward change in trauma centers. *Health Care Management Review*, 38(2), 115-124.

A Conceptual Framework on the Effect of Knowledge Management System Usage, Organizational Learning on Innovation and Organizational Performance

Lucia Ika FITRIASTUTI[1*], Sujoko SUJOKO[2], Tutut HERAWAN[3,4], Yohannes VEMBERI[1]

[1]STIE SBI Yogyakarta; Jl. Ringroad Utara No.17, Condong Catur, Depok, Sleman,Yogyakarta, Indonesia
[2]Universitas Teknologi Yogyakarta; Jl. Ringroad Utara, Jombor, Sendangadi, Sleman, Yogyakarta, Indonesia
[3]AMCS Research Center, Yogyakarta, Indonesia
[4]Sekolah Tinggi Pariwisata Ambarrukmo, Yogyakarta, Indonesia
[*]Corresponding author: Lucia Ika Fitriastuti; E-mail: luciaika79@yahoo.com

Abstract

The use of knowledge management systems and organizational learning can significantly generate innovations to develop organizations. Likewise, innovation has an essential role in improving organizational performance. On this basis, this article aims to shed light on the relationship between the use of knowledge management system, organizational learning, innovation, and organizational performance. Based on an overview of the previous literature, this article presents a model by proposing factors that might influence organizational performance. Literature review was conducted to offer a proposition as an opportunity to be tested in future studies. This article analyzes the conceptual model and methodology to test the model related to the object under study, the way to obtain data, measurement of variable indicators, and methods of data analysis. Thus, it is recommended to test the proposed model using the structural equation model. It is expected that this article can facilitate and set the direction of future researches on knowledge management systems, organizational learning, innovation, and organizational performance.

Keywords: *knowledge management; knowledge management system; organizational learning; innovation; organizational performance.*

1. Introduction

The rapid change in our environment certainly requires many organizations to constantly analyze and be updated about these internal and external changes. Nowadays, most companies hold onto certain knowledge as a strategy to improve their performance and to achieve their goals properly. There are various factors to influence the improvement of organizational performance, including knowledge management system, organizational learning, and innovation. Some previous studies [1], [2], [3] reveal that knowledge management systems can affect organizational performance. Organizations that implement a knowledge management system can easily store the undertaken business information, both which ends up with success and failure. The good implementation of knowledge management system can maintain all organization information and documentation safely. In some references [4], [5], [6], [7] shows that organizational learning can influence the improvement of organizational performance. Organizations with good learning capability can self-evaluate itself to avoid repeating the recurring mistakes and to have better performance. Conclusions from several studies [8], [9], [10], [11] shows that innovations in an organization can improve organizational performance. These innovations may embrace many fields such as innovations in terms of input, process, and output. Making some innovations will enable an organization to set the difference and excellence that distinguish it from other organizations as a competitive advantage to improve organizational performance.

The significant role of knowledge management system and organizational learning in generating innovation with an impact on performance has been statistically proven in the previous studies such as in [3], [4], [7], [11], [12]. On the other side, several studies are unable to prove statistically about the effects of these variables. Part of the results of study Atalay, Anafarta & Sarvan [9] state their incapability of statistically proving about the positive relationship between non-technological innovation (organizational and marketing innovation) and firm performance. Likewise, part of the results of study Zack, McKeen & Singh [1] also fail to verify a direct relationship between knowledge management practices and financial performance. There are also studies revealing no influence between both variables, but if it is mediated by other variables, the variables will be significantly influential, as revealed by Ferraresi *et al*. [2]. Thus, it is conclusive that the direct influence between knowledge management and innovativeness remains unproven. When the strategy orientation mediates the relationship between knowledge management and innovativeness, it will only be proven that the relationship is significant. Similarly, the study cannot prove the direct influence between effective knowledge management on business performance, but when mediated by strategic orientation and innovation, the relationship becomes statistically significant. Some other findings from Gomes & Wojahn [6] also concludes that there is no effect of learning capability in organizational performance. Thus, it is justified to say that the previous studies come up with different opinions, indicating the significance to address this topic using various research subjects and different methods.

Many previous studies have addressed the four variables in this study, namely knowledge management system, organizational learning, and innovation, but separately. Study examined the effect of knowledge management on organizational innovation are [12], [13], [14]. Some previous studies [4], [12], [15], [16], [17], [18], [19], [20] examined the effect of organization learning on innovation. Studies examined the effect of

innovation on organizational performance are [8], [9], [10], [11]. Hence, it is still topical to develop a new model by collaborating the various fragmented studies into a more holistic study to propose a comprehensive model. It is expected that this article can contribute to the development of theories related to factors to improve organizational performance and achieve its objectives using many proposed strategies.

Motivated from the overview of the previous literatures, this article presents a more comprehensive model by identifying factors to improve organizational performance. This article aims to explore the relationship between knowledge management systems, organizational learning, innovation, and organizational performance. Conceptually, it will examine to see the correlation possibility between knowledge management system and organizational learning on innovation and their subsequent impacts on organizational performance.

The rest of this paper is organized as follow: Section 2 discusses the theory and review of the previous researches related to knowledge management system, organizational learning, innovation, and organization performance. Section 3 offers: (1) a proposition based on the literature review to build a conceptual model; (2) a conceptual model of the relationship between the studied variables of knowledge management system, organizational learning, innovation, and organization performance as a whole. Section 4 discusses the possible methodology to be used to test the model for further research. Finally, Section 5 concludes this work and highlight future works.

2. Rudimentary

2.1. Theory on Knowledge Management System

Organizations are required to quickly adapt to the rapid changing environmental conditions. Therefore, it is necessary for an organization to build a knowledge management system with a support of information technology to store and document things related to organizational management activities. According to Darroch [21], knowledge management plays an important role in providing a coordinating mechanism to enhance the conversion of resources into capabilities. Likewise, Yu *et al*. in [12] explained that the knowledge management system is an information system that focuses on managing the resources and processes of organizational knowledge. Iskandar in [22] discern that knowledge management system refers to the use of modern information technology such as the internet, intranets, extranets, and data warehouses to regulate, improve and facilitate intra and inter knowledge management. The knowledge management system is used as a way to achieve the goals of knowledge management applied by companies or industrial groups using information technology. The knowledge management system includes two aspects, namely the hardware aspect such as information technology equipment and software such as system flow in the organization.

Wang & Wang of [23] also explains that knowledge about companies will become an important asset for organizations. Therefore, the application of knowledge management systems will effectively support and enhance organizational knowledge management activities in many companies. Knowledge management systems is a great company resource to face the tight competition with other organizations. Santoro *et al*. [24] suggests that calling for a new and inventive knowledge management system and an open approach is an important strategy to foster knowledge in new disruptive technologies in the Internet-based era that may change the knowledge managed by organizations. By applying this strategy, the company is expected to develop its organization's internal knowledge management capacity to generate innovations.

2.2. Theory on Organizational Learning

To ensure organizational development, every organization is required to earnestly learn from the previous experiences. Willingness and ability to learn shall be applicable not only at the organizational level but also at the level of individuals in the organization. Yu *et al*. in [12] reveals that organizational learning is a company attempt to utilize intellectual and individual social capital to realize the company's potential for innovation. According to Ansari & Kalantari [5], learning in organizations can be done by publishing attitudes, knowledge and mental models of the organization and based on the past knowledge and experience and this important case depends on structure of each organization, although no direction has been specified for it in most organizations. In the field of modern management, to stabilize organizational success and gain competitive advantage, the organizational learning is proposed as a strategic tool [25]. Khunsoonthornkit & Panjakajornsak [7] thinks organizational learning is done by setting the organizational philosophy and resolution to create sustainable solutions and outcomes, and to integrate and exchange perspectives between partners as a way to promote organizations. The corporate culture is done by building awareness for learning and developing in accordance with the organization's strategy to assimilate and modernize the organization.

2.3. Theory on Innovation

Organizational Innovation is a focal point to constantly consider by the organization since organizations will have to face the rapid changes of social demand, technological developments, and the new era of development. Innovation is a way to change organizations, in response to both internal changes and external changes in the environment or as initial steps taken to influence the environment [26]. Innovation has become the basis for achieving the best performance of the company. Innovations can be produced by companies internally or alternately companies can adopt them from external sources [11].

Atalay, Anafarta & Sarvan [9] reveal that in an increasingly changing environment, innovation can broadly be considered as one of the most important sources of sustainable competitive advantage. This is so because it can lead to improvements in products and processes, by making constant progress that helps companies survive, thus enabling faster and more efficient growth to ultimately reap higher profit than that of non-innovators.

Yu *et al*. in [12] show that in developing countries such as Asia, innovativeness is an important organizational capability for sustainable competitive advantage in a dynamic environment. In line with this, Onag, Tepeci & Basalp [20] states that innovation is the key element to improve the sustainability and success of the company.

2.4. Theory on Organizational Performance

It is important to measure organization performance, since good performance can constantly support the achievement of organizational goals using the available resources. Felıcio, Rodrigues & Caldeirinha [27] explained that performance is a composite measure that includes indicators of growth, financial indicators and internal performance. Some qualitative indicators to be used as a measurement of organizational performance are increasing market share and increasing sales. According to Atalay, Anafarta & Sarvan in [9], the suggested performance indicators are perceived performance relative to those of the relevant competitors. Kusuma & Devie in [3] defines organizational performance as the ability of an organization to achieve its objectives by using resources efficiently and effectively. Whereas, according to Kusuma & Devie in [3], financial performance illustrates the extent to which this organization is able to meet the needs of stakeholders and their own needs to survive. In general, performance measurement can be assessed by financial performance and non-financial performance.

3 A Conceptual Framework on the Effect of Knowledge Management System Usage, Organizational Learning on Innovation and Organizational Performance

This section proposes a proposition to build a conceptual model and a conceptual model of the relationship between the studied variables of knowledge management system, organizational learning, innovation, and organization performance as a whole.

3.1. Proposition Development

a. Knowledge Management System and Innovation

Liao & Wu in [28] analyzes the relationship between knowledge management, and organizational learning and innovation organizations using structural equation modeling. The results show that organizational learning is a mediating variable between knowledge management and innovation organizations. Just like systems, knowledge management is an important input, while learning organizations are a key process, thus making organizational innovation as a critical outcome.

Yu *et al*. in [12] examined the relationship between entrepreneurial orientation, technology orientation, Knowledge Management System (KMS), and organizational learning to develop organizational innovation in many developing countries. The results show that the use of a knowledge management system in a company has a positive impact on organizational innovation.

Mardania *et al*. in [14], quantitatively tests the relationship between knowledge management, innovation and performance. The results reveal that knowledge management activities affect innovation and organizational performance directly and indirectly through increasing innovation capability. In depth, it is possible to conclude that knowledge creation, knowledge integration, and knowledge application facilitate innovation and organizational performance. Based on the previous studies, this article offers the following proposition.

Proposition 1: *Knowledge management system usage influences innovation*.

b. Organizational Learning and Innovation

Based on the theory and various previous studies, organizational learning can increase the organization's ability to innovate. This innovation is a key factor in an organization to improve its performance to have the competitive advantage amidst the tight competition with other organizations. Jiménez & Valle [4] that examines innovation, organizational learning, and performance, draws a conclusion that is in line with [12] indicating that organizational learning influences innovation. The results of these studies are in line with [15], [16], [17], [18], [19] which also conclude that organizational learning is positively related to innovation. Onag, Tepeci & Basalp [20] examines organizational learning capability and organizational innovativeness by addressing the effect of organizational learning capability on organizational innovativeness. The results indicate that the dimensions of organizational learning capability significantly influence organizational innovation. Thus, it is possible to recommend the following proposition.

Proposition 2: *Organizational learning influences innovation.*

c. Innovation and Organization Performance

Innovation plays a key role for organizational success, because it enables organizations to deal with the rapid changes in the environment. Rubera & Kirca [8] reviews meta-analysis and integrates various theories related to firm innovativeness and performance. The results of the meta-analysis indicate that firm innovativeness indirectly affects firm value through market position and financial position. Atalay, Anafarta & Sarvan [9] examined the relationship between innovation and company performance. It reveals that technological innovation consisting of product and process innovation has a significant and positive impact on firm performance, but it fails to find any evidence for a significant and positive relationship between non-technological innovation (organizational and marketing innovation) and firm performance. Research by Tsai & Yang [10] that refers to contingency theory and interactional perspectives, develops a conceptual framework to investigate the interaction between market turbulence and the fact that intensity of competition can moderate the relationship between corporate innovation and business performance. The conclusions indicate that the effects of corporate innovation on business performance lead to various result in different configurations of market turbulence and competition intensity. Articles by Ali, Kan & Sarstedt [29] also examine the relationship between absorptive capacity, organizational innovation and organizational performance. The study concluded that three of the dimensions of absorptive capacity, namely acquisition, assimilation, and exploitation, have an influence on innovation and in turn improve organizational performance. Based on the previous studies, the study by Hanif *et al*. [11] also supports that innovation generation and innovation adoption have positive impact on firm performance. Valle *et al*. in [15] concluded that organizational learning and innovation contribute positively to business performance. Thus, it is possible to offer the following proposition.

Proposition 3: *Innovation influences organizational performance.*

d. Knowledge Management System and Organizational Performance

There is a direct relationship between the knowledge management system and organizational performance. Organizations that implement and use knowledge management systems certainly aims to achieve organizational goals by pursuing the best organizational performance. Zack, McKeen & Singh [1] reported the results of exploratory investigations regarding the organizational impact of knowledge management. However, there is no direct relationship found between the practice of knowledge management and financial performance. The practice of knowledge management is found to be directly related to organizational performance which in turn is directly related to financial performance.

Ferraresi *et al*. in [2] concluded that effective knowledge management contributes positively to strategic orientation. Although there is no significant direct effect of knowledge management on innovation, this relationship is significant when mediated by strategic orientation. Effective knowledge management does not have a direct effect on performance, but the relationship becomes statistically significant when mediated by strategic orientation and innovation.

Kusuma & Devie [3] tried to test whether there is a significant influence between knowledge management on competitive advantage and company performance using Partial Least Square. The study shows that knowledge management has a significant influence on competitive advantage and company performance. Based on the review of several studies, the following proposition is offered.

Proposition 4: *Knowledge management system usage influences organizational performance.*

e. Organizational Learning and Organizational Performance

There is a direct correlation between organizational learning and organizational performance. Jiménez & Valle in [4], concludes that organizational learning and innovation variables contribute positively to business performance. Organizational learning also affects the level of innovation.

Ansari & Kalantari in [5] tried to examine organization in the Tehran Stock exchange and saw the relationship between organizational learning and value of companies accepted. The results show that there is a significant and positive relationship

among all the criteria considered in organizational learning and company value on the Tehran Stock Exchange. Gomes & Wojahn [6] analyzed the effectiveness of organizational learning capabilities in innovative performance and organizational performance of small and medium-sized enterprises and [7] analyzed the impact of learning organization and commitment on research performance and development of organizations in Thailand. The results show that learning organizations have a direct effect on organizational commitment and performance. Valle *et al*. [15] concluded that organizational learning and innovation contribute positively to business performance. Based on the results of several previous studies, the following proposition is offered.

Proposition 5: *Organizational learning influences organizational performance*.

3.2. Conceptual Model

Figure 1 presents the conceptual model of the relationship between variable of knowledge management system usage, organizational learning, innovation and organizational performance.

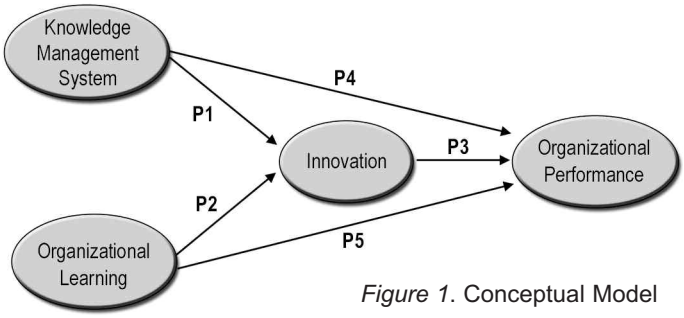


Figure 1. Conceptual Model

a. Discussion on Figure 1

Based on the literature analysis and several propositions in this article, it is possible to develop an empirical study that analyzes the influence of the use of knowledge management system and organizational learning on innovation and their subsequent impact on organizational performance.

Figure 1 above depicts our proposed conceptual model. The P1 proposes the relationship between the knowledge management system usage and the innovation. There is a possibility that the better the use of a knowledge management system in an organization the better the urge of organizations to innovate. The P2 proposes the relationship between organizational learning and Innovation. There is a possibility that the learning conducted by all components in the organization will encourage organizations to innovate. The P3 proposition is a relationship between innovation and the organization performance. There is a possibility that the various kinds of innovation selected by an organization will improve organizational performance. The P4 proposes the relationship between the knowledge management system on the organizational performance. It is implied that the use of a knowledge management system can directly improve organizational performance. The P5 proposes the relationship between organizational learning and organization performance. There is a possibility that the learning process carried out by the organization will improve organizational performance because the organization has more experience and learning process in making decisions.

b. The comparison between the proposed conceptual model with the previously proposed models

Table 1 shows the comparison between variables used in the conceptual model proposed in this article with those used in the previous studies.

No.	Variable / Indicator	[2]	[8]	[12]	[14]	[24]	Proposed Model
1	Knowledge Management System Usage	Yes	No	Yes	Yes	Yes	Yes
2	Organizational Learning	No	No	Yes	No	No	Yes
3	Innovation	Yes	Yes	Yes	Yes	Yes	Yes
4	Organization Performance	Yes	Yes	No	Yes	No	Yes

Table 1. Comparison between variables analyzed by the previous researches

There are several previous studies that discuss related variables proposed in the concept of this study. However, the previous researches model separately examined the variable of knowledge management system usage, organizational learning, innovation, and organization performance. The model developed in [2], [14] discusses variables related to knowledge management system usage, innovation and organization performance, but does not relate to organizational learning. Rubera & Kirca [8] discusses the relationship between innovation and organization performance variables but does not relate them to knowledge management system usage and organizational learning. The model developed in Yu *et al*. [12] addresses knowledge management system usage, organizational learning, and innovation, but does not associate it with organizational performance. Meanwhile, Santoro *et al*. in [24] analyzes the variable of knowledge management system usage and innovation but does not relate it to organizational learning and organization performance. In this article, a model is developed by considering all variables, namely the variable of knowledge management system usage, organizational learning, innovation and organization performance. Thus, the advantages of the conceptual model proposed in this article over the previous studies is the more complete and comprehensive formation of a new model by analyzing the relationship between the four variables that have never been studied before.

4. Discussion

Various factors that affect the organization performance will always be the concern of the organization manager. Organizational performance, be it financial performance or operational performance is the key factor to take heed in the organization. Therefore, an organization leader is entitled to analyze and master any factors that can improve organizational performance. Good performance enables the organization to achieve its goals by using the available resources effectively and efficiently. One of the much-needed resource today is knowledge. Maximum use of knowledge can create competitive advantages, which may have an impact on performance. To maximize organizational knowledge, the organization is required to form or use a knowledge management system to carry out collective management of knowledge. The knowledge management system can help organizations to collect, manage, and disseminate all knowledge and information obtained by the organization. Thus, the optimum use of knowledge management system will improve the organizational performance.

Organizations and the individual elements within an organization will have to face various types of events and activities to achieve organizational goals on a daily basis. As time goes by, there will be a learning process in the organization, which depends on the capacity of each organization. The learning process will be ensued with a process of changing the organization or individuals knowledge. The provision of knowledge from the learning process will affect organizations and individuals in the organization in making decisions, overcoming problems, and evaluating the achievement of organizational goals. The benefit of organization learning lies on its increasing ability to choose various strategies to respond to changes in the organization environment quickly and precisely. The selection of the right strategy will also have an impact on

creating competitive advantage and impact on improving performance.

Amidst the current era of uncontrolled competition, all parties are required to adapt to the latest technological developments. The knowledge management system will be easily applied using information technology. Therefore, organizations will have to prepare technological information facilities and infrastructure in the form of both hardware and software, establish the implementation and documentation procedures for all information, and link the system with all organizational stakeholders. By constantly applying knowledge management system in an organization through socialization, analysis, forum evaluation, the organization will experience learning process. Thus, the use of a knowledge management system and the implementation of organizational learning will make it easier for organizations to choose appropriate strategies through the availability of complete information and experience. One option of strategic opportunity is a strategy to innovate, since appropriate innovation can turn ideas into profits.

In his book [30] explains that innovation is the initial commercialization of inventions by producing and selling a new product, service, or process. There are two types of innovations namely incremental innovation and breakthrough innovation. Incremental innovation is a simple change in the product, service, or process. Breakthrough innovations show higher innovation leaps towards improvement of products, services, or processes within the company. On the other side, applying the innovation development strategy is not easy. Cozijnsen, Vrakking & Ijzerloo by [31] on companies / projects in the Netherlands revealed that 39% of innovation projects ended up with failure. Thus, it is important to use the knowledge management system and the appropriate implication of the organizational learning process.

The performance of the organization can be seen from its financial or non-financial performance. One aspect of financial performance is profitability, while non-financial performance is reflected in the growth of the organization, the level of customer satisfaction, labor conditions, service, product quality, and others.

It is possible to test the presented conceptual model in Figure 1 using the existing field data. Several factors might moderate the relationship between variables. As illustrated in Rubera & Kirca [8], the organizations studied can be divided into large groups of organizations or small groups of organizations, groups of high-tech or low-tech organizations, and groups of organizations in western or non-western countries. The innovation variable also has two choices, be it the incremental innovation or radical innovation.

Data were collected through questionnaires. The following presents the measuring indicators to be used in a questionnaire.

To measure knowledge management system, we can use indicators as in the Santoro *et al*. [24]. It is possible to see knowledge management system from 3 dimensions:

a. Dimensions of Information Technology infrastructures :

- ❑ The amount of funds spent for new information technology hardware and software.
- ❑ The use of extranet.
- ❑ The use of intranet.
- ❑ The use of LAN.
- ❑ The use of website

b. Dimensions of collaborative technologies:

- ❑ Discussion forums.
- ❑ Shared databases.
- ❑ Document repositories.
- ❑ Workflows.

c. ICT (Information and Communication Technologies) adoption:

- ❑ The use of ICT to inform employees or receive information from employees.
- ❑ The use of ICT to exchange knowledge and information with customers.
- ❑ The use of ICT to exchange knowledge and information with suppliers, competitors and partners.

To measure organizational learning, we can use indicators as in the Yu *et al*. by [12], which measures organizational memory (composite reliability = 0.80; AVE = 0.57). The followings are the list of possible questions to ask:

- ❑ We widely share the institutionalized routines among our employees and groups.
- ❑ We have a knowledge base for reference when we analyze the needs of our customers.
- ❑ We have a knowledge base for reference to deal with the repeated problems.

Measurement of organizational innovativeness (composite reliability = 0.87; AVE = 0.62) in Yu *et al*. by [12] addresses the following questions:

- ❑ We are fast to respond to our customers.
- ❑ We are fast to introduce innovative products or services.
- ❑ Innovation is encouraged in our firms.
- ❑ Our firm is reputable as an innovator in our industrial sector.

To measure performance, we can use the indicators used in the Mardania *et al*. by [14].

The question to ask is “compared with the key competitors, your company performance:

- ❑ Grows faster.
- ❑ Is more profitable.
- ❑ Achieves higher customer satisfaction.
- ❑ Provides higher quality products.
- ❑ Is more efficient in using resources.
- ❑ Has internal processes oriented to quality.
- ❑ Delivers orders quicker.
- ❑ Has more satisfied employees.
- ❑ Has more qualified employees.
- ❑ Has more creative and innovative employees.

After collecting data, we can use Confirmatory Factor Analysis (CFA) as a hypothesis testing to measure the validity of the model in accordance with empirical data. Afterwards, we can process data to test the model using Structural Equation Modeling (SEM), which can lead to path analysis to test the model as a whole.

5. Conclusion and Future Works

The concept of knowledge management system usage and organizational learning are still topical to analyze to determine its impact on innovation and organization performance. Information and knowledge that an organization receives from the learning process is a valuable asset to be well documented in a knowledge management system. Providing that both factors go well, the organization will be more encouraged to carry out continuous innovation to improve its performance.

This article can greatly contribute to future researches since it has presented a complete proposition, conceptual model, variable measurement indicators, alternative research objects, and suggestions on how to analyze the data. It is recommended that further research can test this model empirically according to the applicable situation and conditions. There are several things to develop from this model. First, future researchers have t\he option to test large, medium or small-scale organizations. Second, the future researchers are free to choose several existing industrial groups such as trading, service, or manufacturing companies. Third, it is possible to select the object of research in the same industry group, be it the group of companies with high technology or low technology. Fourth, it is possible to select the object of research in industrial groups located in different parts of the world, be it the western or non western countries. Fifth, it is possible to examine organizations facing rapid or stable environmental changes. Finally, it is also possible to add various moderating variables to strengthen the relationship between these variables such as market turbulance, organizational commitment and absorptive capacity.

Acknowledgement

This work is supported by Universitas Teknologi Yogyakarta and STIE SBI Yogyakarta, Indonesia.

References

[1] M. Zack, J. McKeen and S. Singh (2009). "Knowledge Management and Organizational Performance. An Exploratory Analysis", *Journal of Knowledge Management*, vol. 13, no. 6, pp. 392-409.

[2] A. A. Ferraresi, C. O. Quandt, S. A. d. Santos and J. R. Frega (2012). "Knowledge Management and Strategic Orientation Leverging Innovativeness And Performance", *Journal of Knowledge Management*, vol. 16, no. 5, pp. 688-701.

[3] F. S. D. Kusuma and Devie (2013). "Analisa Pengaruh Knowledge Management Terhadap Keunggulan Bersaing dan Kinerja Perusahaan", *Business Accounting Review*, vol. 1, no. 2, pp. 161-171.

[4] D. Jiménez-Jiménez and R. Sanz-Valle (2011). "Innovation, Organizational Learning, and Performance", *Journal of Business Research*, no. 64, p. 408-417.

[5] K. Ansari and a. E. Kalantari (2013). "Effect of Organizational Learning on Firm Value in the Tehran Stock Exchange (TSE)", *Journal of Novel Applied Sciences*, vol. 2, no. 12, pp. 763-768.

[6] G. Gomes and R. M. Wojahn (2016). "Organizational Learning Capability, Innovation And Performance Study In Small and Medium-sized Enterprises", *Revista de Administração*, no. 52, pp. 163-172.

[7] A. Khunsoonthornkit and V. Panjakajornsak (2018). "Struktural Equation Model to Assess the Impact of Learning Organizational and Commitment on The Performance of Research Organizations", *Kasetsart Journal of Social Sciences*, vol. xxx, pp. 1-6.

[8] G. Rubera and a. A. H. Kirca (2012). "Firm Innovativeness and its Performance Outcomes. A Meta-Analytic Review and Theoretical Integrations", *Journal Marketing*, vol. 76, p. 130-147.

[9] M. Atalay, N. Anafarta and F. Sarvan (2013). "The relationship between innovation and firm performance: An empirical evidence from Turkish automotive supplier industry", *Social and Behavioral Sciences*, vol. 75 , p. 226-235 .

[10] K. H. Tsai and S. Y. Yang (2013). "Firm innovativeness and business performance: The joint moderating effects of market turbulence and competition", *Industrial Marketing Management*, vol. xxx, pp. 1-16.

[11] M. I. Hanif, M. S. Akhtar, M. K. Nawaz and S. J. Abbas (2013). "Impact of Innovation Generation and Adoption on Firm's Performance", *South Asian Journal of Banking and Social Sciences,* vol. 3, no. 1, pp. 101-117.

[12] Y. Yu, X. Y. Dong, K. N. Shen, M. Khalifa and a. J. X. Hao (2013). "Strategies, Technologies, and Organizational learning For Developing Organizational Innovativeness in Emerging Economies", *Journal of Business Research*, no. 66, p. 2507-2514.

[13] S. H. Liao and C. C. Wu (2010). "System perspective of knowledge management, organizational learning,and organizational innovation", *Expert Systems with Applications*, vol. 37 , p. 1096-1103.

[14] A. Mardania, S. Nikoosokhan, M. Moradi and M. Doustar (2018). "The Relationship Between Knowledge Management and Innovation Performance", *Journal of High Technology Management Research*, no. 29, pp. 12-26.

[15] R. Sanz-Valle, J. C. Naranjo-Valencia, D. Jime´nez-Jime´nez and a. L. Perez-Caballero (2011). "Linking Organizational Learning with Technical Innovation and Organizational Culture", *Journal of Knowledge Management*, vol. 15, no. 6, pp. 997-1015.

[16] I. M. Salim and M. Sulaiman (2011). "Organizational Learning, Innovation and Performance: A Study of Malaysian Small and Medium Sized Enterprises", *International Journal of Business and Management*, vol. 6, no. 12, pp. 118-125.

[17] C.-H. Fang, S.-T. Chang and a. G.-L. Chen (2011). "Organizational learning capability and organizational innovation The moderating role of knowledge inertia", *Journal of Knowledge Management*, vol. 15, no. 6, pp. 997-1015.

[18] H. Tohidi and M. Mandegari (2012). "Assessing the impact of organizational learning capability on firm innovation", *African Journal of Business Management*, vol. 6, no. 12, pp. 4522-4535.

[19] O. Çömleka, H. Kitapçı, V. Çelik and M. Özşahind (2012). "The Effects Of Organizational Learning Capacity on Firm Innovative Performance", *Social and Behavioral Sciences*, no. 41, pp. 367-374.

[20] O. A. Onag, M. Tepeci and A. Basalp (2014). "Organizational Learning Capability and its Impact on Firm Innovativeness", *Social and Behavioral Sciences*, vol. 150, pp. 708-717.

[21] J. Darroch (2005). "Knowledge management, innovation and firm performance", *Journal of Knowledge management*, vol. 9, no. 3, pp. 101-115.

[22] K. Iskandar (2014). "Pengembangan Knowledge Management System Pada Bina Nusantara Berbasis Micrososft Sharepoint 2010", *ComTech*, vol. 5 , no. 1, pp. 429-440.

[23] Y.-M. Wang and Y.-C. Wang (2016). "Determinants of firms knowledge management system implementation: an empirical study", *Computer in Human Behavior*, vol. 64, pp. 829-842.

[24] G. Santoro, D. Vrontis, A. Thrassou and L. Dezi (2017). "The Internet of Things_Building A Knowledge Management System for Open Innovation and Knowledge Management Capacity", *Technological Forecasting & Social Change*, pp. 1-8.

[25] V. Saadat and a. Z. Saadat (2016). "Organizational Learning as a Key Role of Organizational Success", *Social and Behavioral Sciences*, no. 230, p. 219-225.

[26] G. T. M. Hult, R. F. Hurley and G. A. Knight (2004). "Innovativeness: Its antecedents and impact on business performance", *Industrial Marketing Management*, vol. 33, pp. 429-438.

[27] J. A. Felıcio, R. Rodrigues and V. R. Caldeirinha (2012). "The effect of intrapreneurship on Corporate performance", *Management Decision*, vol. 50, no. 10, pp. 1717-1738.

[28] S.-H. Liao and C. C. Wu (2010). "System Perspective of Knowledge Management, Organizational Learning, and Organizational Innovation", *Expert Systems with Applications*, no. 37, pp. 1096-1103.

[29] M. Ali, K. A. Kan and M. Sarstedt (2016). "Direct and configurational Path of Absorptive Capasity and Organizational Innovation to Successful Organizational Performance", *Journal of Business Research*, vol. 09113; 7.

[30] J. A. Pearce and R. B. Robinson (2007). Strategic Management, America: McGraw-Hill.

[31] A. J. Cozijnsen, W. J. Vrakking and M. v. IJzerloo (2000). "Success and failure of 50 innovation projects in Dutch companies", *Eurepeon Journal of Innovation Management*, vol. 3, no. 3, pp. 150-159.

The Ideal Management of Health Insurance for Indonesia According Constitution

Arief BUDIONO[1], ABSORI[2], HARUN[3], Heru Santoso Wahito NUGROHO[4], Khudzaifah DIMYATI[5], Kelik WARDIONO[6]

[1]Corresponding author, Lecturer, Faculty of Law Universitas Muhammadiyah Ponorogo, Ponorogo, Indonesia; E-mail: areevahims@gmail.com
[2]Professor, Faculty of Law, Universitas Muhammadiyah Surakarta, Surakarta, Indonesia; E-mail: absorisaroni@gmail.com
[3]Professor, Faculty of Law, Universitas Muhammadiyah Surakarta, Surakarta, Indonesia; E-mail: harun.dr@gmail.com
[4]Associate Professor, Department of Health Management, Health Polytechnic of Surabaya, Surabaya, Indonesia; E-mail: heruswn@gmail.com
[5]Professor, Faculty of Law, Universitas Muhammadiyah Surakarta, Surakarta, Indonesia; E-mail: kd255@ums.ac.id
[6]Associate Professor, Faculty of Law Universitas Muhammadiyah Surakarta, Surakarta, Indonesia; E-mail: liekums@gmail.com

Abstract

Indonesia is a country which is still facing serious issues on health insurance. The health cost is still high and its service is not yet well-distributed in this country. Ironically, the state's contribution, as an institution which has the role to support prosperity of its citizens, is still far from ideal.
The country may use its laws and authority to provide the National Health Insurance (Jaminan Kesehatan Nasional/JKN) for all citizens of Indonesia. One role of a country is to protect the rights and the health needs of its citizens as mandated in the Indonesian Constitution. By analyzing the National Health Insurance system of Indonesia, it may make us realize that in reality, hundreds of million citizens are in need.
In line with the Mandate of the Constitution and the Human Rights Declaration, thus the Constitution Number 36 year 2009 on Health (which will be abbreviated UUK/Undang-Undang Kesehatan) states that every person has the right to receive health services. Because of that, every individual, family, and community have the right to receive protection of their health, and the state has the responsibility to make sure that the citizen's rights for living healthily are achieved, including for the poor and the needy. The National Health Insurance should also give the chance for groups of people under the poverty line to have a dignified standard of life, so that poverty is not inherited from one generation to the next.

Keywords: *insurance, health, national, ideal.*

1. Background

The establishment of the social insurance, namely the National Health Insurance or JKN for every citizen as mandated in the Constitution Article 28H Paragraph (3) on social insurance and Article 34 Paragraph (2) on the Republic of Indonesia's 1945 Constitution states that, "the State develops a social insurance system for all citizens and it empowers the weak and the poor according to the human dignity" (Muhtaj, 2008, p. 152).

The National Health Insurance of Indonesia is a part of the national social welfare system in this country. The execution of Indonesia's JKN is a social insurance system which is full of issues, such as the cases where patients are rejected, the JKN budget which is much lower than the actual health fees, JKN sanctions and fines, and other problems which may disturb the smoothness in applying this health insurance. The condition where there are many issues regarding the JKN is a bitter reality.

The Indonesian National Social Insurance System, especially the National Health Insurance is a concept which is normatively the same as the social and the health insurances which are applied in other countries. The social insurance in this case are health insurances which are established by the state to give social protection to its citizens. The state establishes it with two concepts: the former is a full protection paid by the state, and the latter is a concept of social insurance which is compulsory. The latter requires fee payment from the citizens and is supported by the state.

The Constitution's mandate is the foundation of why Indonesia must give great efforts so that the social insurance which is dignified may be established (Budiono, 2016, p. 9) and that all citizens may access health services evenly and with justice. One basic principle of health development is that each person has the same right to achieve the highest form or health, regardless of tribe, group, religion, and social as well as economic status (Rachmat, 2018, p. 11). The National Health Insurance Program (JKN) frees the people form financial burdens when they are sick whether they are rich or poor (Hasanah, 2017). Based on the explanation above, thus the research problem is, "How is the ideal concept of National Health Insurance for Indonesia?"

2. Methods

This research used juridical normative methods and library research approach. This research is also a prescriptive study, which aims to offer solution towards the problems in the Indonesia's national health social security.

3. Research Results and Discussion

The discussion on social insurance cannot be separated from the history of how this social insurance appeared first hand

in the United States of America in *The Social Security Act* year 1935 to solve the problems of unemployment, senior citizens, sick people and children as a result of the great economic depression. Even though the establishment of social insurance in the developed countries has recently experienced change, basically the establishment of the social insurance in those countries is understood as a real form of the state's protection towards its citizens (Mudiyono, 2002, pp. 68-69).

As explained by Cheyne, O'Brein and Belgrave (O'Brien & Belgrave, 1998, p. 176), social insurance is the execution of the state's social function to its citizens. This social function is an obligatory service from the state, and this function is not based on economic area. The state will not consider profit and loss in undergoing social insurance for its citizens. Thus, as it is not based merely on economic areas, the social insurance is not a way to obtain financial profits for the government or the state apparatus. Below is the essence of what we know of this 'social insurance':

"*First, as a system of state financial support that is paid to those persons who are not provided for adequately by the market. Second, as a system of state financial support paid to those persons who are unable to secure adequately*."

The state runs its health protection function to its weak citizens by giving financial support, namely the health insurance system, which is ran in Indonesia through BPJS (Badan Penyelenggara Jaminan Sosial)/ Health or other mechanisms. Indonesian citizens have the right to obtain this insurance when they are in an insecure condition, for instance when their sources of income, like the work opportunities are rare. Apart from that, compensation is given to other weak groups which are unlucky, such as those with certain physical conditions (disabled, sick, pregnant) which makes them unable to receive income or to pay for the basic health services.

Government-sponsored social security, including the national health insurance emerged about a century ago with providing effective protection, particularly coverage and cost distribution. The Government Intervention on the social welfare systems have grown to account for substantial portions of government budgets as a duty of welfare state. The government also typically develop an explicit plan showing that projected revenues are sufficient to finance projected expenditures for several years into the future (or, if revenues are not sufficient, explaining how the government proposes to balance projected receipts and scheduled benefits) (Thomson, 1994, pp. 10-11).

There are differing opinions on how social welfare (in this case is the health insurance) should be established. Should it be applied universally to all citizens, or should it only be given to some groups of citizens (selective, like only to the poor, the displaced, and those who pay)? Another debate is on what form the national health insurance should be given: basic treatments, benefits in cash, follow-up treatments, or benefit in-kind?

Countries with a developed state-administration system have detailed information on each of its citizens' bank accounts. In countries with this condition, citizens with certain criteria which have been determined will periodically receive income transfers from the state. Even so, not all social welfares are given in the form of money. There are some state compensations which are given in the form of non-cash (in kind) as well as services: health services, education, housing, etc.

The concept of social welfare in a welfare state is usually based on the principle of equal opportunity, equitable distribution of wealth, and public responsibility from the state to those who are unable to pay their own minimum needs to obtain worthy health services or groups of the weak (McLean, McMillan, & State, 2009).

One of the government's effective means to intervene is through the financial policies (the state budget/*Anggaran Pendapatan dan Belanja Negara*/APBN) which allocates significant budget for public needs in the health sector including aide programs in the form of the National Health Insurances as an effort to erase poverty (Sugema & Anggraenie, 2009, p. 323).

The social welfare program which are allocated in the state's budget in the form of the social insurance system and the national health system functions as a social protection. Without a system which insures health funding for citizens, thus more and more people will not be able to obtain the health services they need. With the tendency of increasing living costs, including the healthcare fees, thus this will increase the difficulty of the citizens to access health services which they need, especially when they must pay for the fees themselves (*out of pocket*) in the system of *fee for services* (Kadarisman, 2015, pp. 474- 475).

The aim of health services as written in the mandate of the Health Constitution is to increase awareness, desire, and ability to live healthily to obtain the highest degree of social health as an investment to develop productive human resources socially and economically. The health insurance is an insurance in the form of health protection so that its participants may achieve the benefits of healthcare and protection in achieving the basic health needs (Mas'udin, 2017, p. 112).

The establishment of the social welfare program in Indonesia is a form of healthcare for its citizens through the National Health Insurance Program which is established by BPJS. The execution of the National Health Insurance Program based on the Constitution Number 24 Year 2011 on BPJS also states that the National Social Insurance is executed by BPJS, which include BPJS Health (Nuryartono & Saparini, 2009, pp. 283-284). Concretely, the state is responsible in giving health services as well as basic health needs for its citizens to a certain extent. The state has a responsibility to solve social, economic, and health issues faced by the citizens (Kartasasmita, 2002, p. 13).

As a state, Indonesia has the main responsibility to provide healthcare and welfare to its citizens. The state must insure the health rights of its citizens are achieved (Zain, Yurista, & Yuniza, 2014, p. 72) by managing the National Health Insurance and also contribute in its payment. The social welfare system and the National Health Insurance are some of the efforts to develop and to give social protection as a way to make the citizens prosper.

If the Indonesian National Health Insurance is said to be a national social insurance, in reality it is an unideal paradox. The Constitution obligates the state to build a Social Insurance system for all citizens. The form of Indonesia's National Health Insurance may not be able to fulfill all of the citizen's rights to obtain social insurance. Only those who pay will obtain such services.

In reality, the social welfare is a human right and the state must fulfill it, but in the Constitution of the National Social Welfare System (UU SJSN/*Sistem Jaminan Sosial Nasional*) and the Constitution of the Social Security Administrator (UU BPJS) which uses the social insurance mechanism, the state has changed it so that it is the citizens' obligation to participate in this insurance. The state should have a dominant role in the establishment (i.e. in the payment) of the National Health Insurance in increasing the budget allocation for health, which is still currently only as low as 5%, as it is the state's responsibility (Kadarisman, 2015, p. 469).

In the execution of the National Health Insurance concept, the state is only a facilitator between the citizens and the Social Security Administrator with the concept of insurance (the official form of BPJS is as a public administrator). The state positions itself as the insurance's agent and has the role as a supervisor to the granting of rights for social welfare from employers or from the citizens, instead of as an insurer in the social welfare system (Winarto, 2012, p. 22).

The state should also be present in the National Health Insurance a fix the INA CBG scheme, making it more responsive, so that the National Health Insurance will not become a burden of the health facilities, which will end up as the bankruptcy of the health facilities or the rejection of JKN-BPJS patients.

The role of BPJS in the Constitution of the National Social Welfare System (UU SJSN) and the Constitution of the Social Security Administrator (UU BPJS) automatically weakens the position of "every citizen" maybe stigmatized as the state's

"arrogance" (Wahid, 2012, p. 66). The state positions itself and BPJS in the superiority level and has the sovereignty as a "giver", sponsor, a helping god, as well as a debt collector. The concept of BPJS as a public administrator which has the role to manage and to bind the society, and also gives sanctions to the citizens is a paradoxical concept which must be eradicated. BPJS in JKN must be responsive as it must become a way for the state to give social services.

The practice of threatening with sanctions, both in the form of fines and the abolition of certain services to the citizens as applied in the JKN must be banned as sanctions do not actually exist in the concept of social insurance. The practice of threatening with sanctions and the coercion of the citizens to pay for the JKN fees, and at the same time the state only allocates a small amount of budget for health is not an ideal social insurance, and it is not even worth to be called social welfare. Indonesia must not give up its responsibility and force the citizens to pay for the JKN fees.

4. Conclusion

The state must take a dominant portion of payment for the JKN by allocating a higher amount of budget. The lack of funds after the state takes a dominant portion may be fulfilled from the wealthy citizens' contributions as a form of the citizens' participation because anyhow the JKN payment needs a large amount of money.

The social welfare system in all countries is generally organized and it has become the responsibility of the state to pay for it. The JKN program is a form of universal health insurance where the citizens' health fees are supported by the government. If by some reason the state's fees cannot fulfill all fees, thus the state takes the largest portion in the form of national health insurance using the social insurance scheme, a united system between payment from the government and the citizens' obligation. The use of the social insurance mechanism of the social savings which are obligatory (or compulsory insurance) is paid from contributions which are paid by the participants.

Acknowledgement

This article was Supported by LPDP (Lembaga Pengelola Dana Pendidikan) Indonesia.

References

[1] Budiono, A. (2016). The Policy of the National Social Security System Execution through the Social Security Administering Body (BPJS) with the System of Insurance (Kebijakan Penyelenggaraan Sistem Jaminan Sosial Nasional Melalui BPJS Dengan Sistem Asuransi). *Journal Law Pro Justitia*, vol. 2(1), 9.

[2] Hasanah, N.A. (2017). *The Execution of the Work Relations between Hospitals and the National Security Administering Body (BPJS) of Employment in the National Health Insurance Program (JKN) (Pelaksanaan Hubungan Kerja Antara Rumah Sakit dan BPJS Ketenagakerjaan dalam Program JKN)*. Universitas Muhamadiyah Surakarta.

[3] Kadarisman, M. (2000). Analysis of the Social Insurance System of Health Execution Post Constitutional Court Decision Number 007/PUU-111/2005 (Analisis Pelaksanaan Sistem Jaminan Sosial kesehatan Paska Putusan MK Nomor 007/PUU-111/2005). *Journal Hukum Ius Quia Iustum*, 22(3), 469.

[4] Kartasasmita, G. (2002). *Crises, Economy and Indonesia's Economic Future 13 (Krisis, Ekonomi dan Masa Depan Ekonomi Indonesia 13)*. Bandung: Program Magister Manajemen Universitas Padjajaran.

[5] Mas'udin (2018). Identification of Financial Issues in the National Social Health Insurance (Identifikasi Permasalahan Finansial pada Jaminan Sosial Kesehatan Nasional). *J Info Artha*, 1(2), 112.

[6] McLean, E. I., McMillan, A., State, M.W. (2009). *The Concise Oxford Dictionary of Politics*. Retrieved October 15, 2018, from http://www.oxfordreference.com.offcampus.lib.washington.edu/views/ENTRY.html;

[7] Mudiyono. (2002). Social Security in Indonesia: the Relevance of an Informal Approach (Jaminan Sosial di Indonesia: Relevansi Pendekatan Informal). *J Ilmu Sosial dan Ilmu Politik*, 6(1), 68-69.

[8] Muhtaj, M.A. (2008). *Dimensions of the Human Rights: Analysis of Economic, Social, and Cultural Rights (Dimensi-Dimensi HAM: Mengurai Hak Ekonomi, Sosial, dan Budaya)*. Jakarta: Rajawali Pers.

[9] Nuryartono, N., Saparini, H. (2009). Economic Constitution: The New Direction of Indonesia's Economic Revival (Ekonomi Konstitusi: Haluan Baru Kebangkitan Ekonomi Indonesia). *Kesenjangan Ekonomi Sosial dan Kemiskinan* (pp. 283-284) Jakarta.

[10] O'Brien, C.C., Belgrave, M. (1998). *Social Policy in Ao Tearoa New Zealand: A Critical Introduction*. Duckland: Oxford University Press.

[11] Rachmat, H.H. (2018) *Acceleration of the Health Development in Indonesia: Based on the Paradigm of Health and the Basic Thought of Health Development (Percepatan Pembangunan Kesehatan di Indonesia: Melandaskan Pada Paradigma Sehat dan Pemikiran Dasar Pembangunan Kesehatan)*. Yogyakarta: UGM Press.

[12] Sugema, I., Anggraenie, T. (2009). *Development Budget and State Expenditures for Citizens. Economic Constitution: New Direction for Indonesia's Economic Revival (APBN untuk Rakyat. Ekonomi Konstitusi: Haluan Baru Kebangkitan Ekonomi Indonesia)* (Soegeng Sarjadi dan Iman Sugema ed.). Jakarta: Soegeng Sarjadi Syndicate.

[13] Thomson, L.H. (1994). The Advantages and Disadvantages of Different Social Welfare Stategies. *Journals of Social Security Bulletin*, 5(2), 10-11.

[14] Wahid, A. (2012). Social Insurance or Insurance for the State (Jaminan Sosial atau Jaminan Untuk Negara). *J Desain Hukum*, 11(4), 66.

[15] Winarto, F.H. (2012). The Ideal Format of the National Social Security System Constitution and the National Security Administering Body (BPJS) Constitution (Format Ideal UU SJSN dan UU BPJS). *J Desain Hukum*, 11(4), 22.

[16] Zain, M.A., Yurista, A.P., Yuniza, M.E. (2014). Consistency of Social Security Management towards the Concept of Indonesia as a Welfare State (Konsistensi Pengaturan Jaminan Sosial Terhadap Konsep Negara Kesejahteraan Indonesia). *Jurnal Penelitian Hukum*, 1(2), 72.

Performance and Success of New Product Strategies in Market Competition: Business Buyer Behavior and Marketing Mix Series of Fast Moving Consumer Goods (FMCG)

R. Agus TRIHATMOKO

Faculty of Economics and Graduate Program, University of Surakarta, Indonesia; E-mail: agustricentre@gmail.com

Abstract

This paper aims to explore the strategy of the product mix to perceive and describe theoretically through understanding of the analysis of new products in market competition. Deepening efforts through identifying product strategies is to target the chances of success of new product strategies from the FMCG industry. This study applies a methodological combination of qualitative research by using a grounded theory approach and interpreted constructivism and conditional matrices, as well as starting with the results of previous studies that have used the phenomenology-constructivism approach. The study results revealed with a construction that the success of the performance of new products through a product strategy (marketing mix) entering the market will be depend on customer and market competition. The results highlight several factors that support the success and failure of a new product entering the market, namely the accuracy of the quality, features and design of the product, product and brand performance, market demand and selling turnover of products. The results of this study can be as recommendations to marketers, practitioners and consumers, especially in FMCG marketing.

Keywords: *performance and success; new product strategy; business buyer behavior; marketing mix; fast moving consumer goods (FMCG).*

1. Introduction

New products are created by the company as a strategic effort to improve business performance in all business lines of the company. One of the achievements of business performance for a new product is increasing the performance of product sales. To achieve the target of selling a product will be faced with market competition. The strategy of "developing/innovating" new products includes the expansion of product brands and product categories or called brand strategies in the form of line extensions, brand extensions, multi brands and new brands (Nijssen and Agustin, 2005; Kotler and Armstrong, 2013). Mass products from various types of companies have developed in markets where companies have used brand strategies as well as manufacturers in the Fast Moving Consumer Goods (FMCG) industry. When companies innovate new products, there will be a choice of marketing mix according to their choice of brand strategy type, and all will be related to the marketing mix strategy of product, price, place, and promotion (4P's). This confirms that the marketing mix is the main concept of marketing strategies in the FMCG market competition (Trihatmoko, Mulyani and Lukviarman, 2018). The term marketing mix or known as the marketing mix name can be used to explain both activities, such as pricing, or marketing instruments, such as price lists. When marketers try to determine the best marketing mix for their products, they encounter a large number of alternatives. The best way to reduce the number of alternatives to the amount that can be handled is to take a strategic focus. In other words, the formulation of the marketing strategy is made on the scope of the most optimal marketing mix combination.

However, in the last two decades of research on "4P elements" the marketing mix for FMCG products is still rarely done by previous researchers. Previous research was limited to marketing mixes related to purchasing behavior, but has not yet conceptualized in detail on each element of 4P's (Hankansson and Waluszewskie, 2005; Jia Hu, 2011). Some studies identify the brand strategies categorization of product strategy, but has not directed a new product concept in market competition (Sarangapatani and Mamatha, 2008; Beneke et al., 2013). Departing from these studies, opportunities for deeper development are obtained, so that will produce concepts related to re look for the 4P's element through the analysis of the business buyer behavior concept, with the hope of expanding the product concept that is different from the conception in the previous literature (Lewin and Donthu, 2005; Sashi, 2009; Peter and Donnelly Jr., 2011; Solomon, 2013).

The deepening of the transactional context of new products between distributors as sellers and wholesalers as buyers by obtaining the results of research in the form of purchasing decision concepts by buyers with various models related to 4Ps elements has provided a new understanding of relationship marketing theory by using agency perspectives theory in the field of marketing management. However, the marketing mix on the results of these studies is still in the behavioral domain between agents that are transactional and relational for new products. In this case the form of a purchase transaction includes type of new task purchase (Sashi, 2009; Solomon, 2013). Meanwhile, the results of this transaction represent sales performance in the first stage (first-entry). On the other hand, the performance of product sales is repetitive and sustainable or called selling turnover (Trihatmoko, 2016). For this reason, the focus is on the P of products, which is part of the problem that has not been revealed in the marketing mix concept related to product strategy policies by "FMCG" producers. The question is how the strategic policies of producers are set for a new product in order to achieve performance and product success in the market? The problem of new product strategies is important to be explored and revealed, because producers/manufacturers

are principals who determine product strategies to be run by their suppliers or agents. This paper aims to explore the strategy of the product mix to perceive and describe theoretically through understanding of the analysis of new products in market competition. Deepening efforts through identifying product strategies is to target the opportunities for success of new product strategies from the FMCG industry, as well as at the same time expanding business buyers' behavior and 4P's of marketing mix. It can be understood that the product concept can be estimated to be related to other 4P's concepts, but the deepening focus on one by one "P" will be obtained rigidly, meaning the specific concept of the new product is revealed, so it can facilitate theoretical and practical understanding. The conceptualization and theorization of the results of this study are expected to contribute to the concept of business buyer behavior and marketing mix, and that is no less important in practice can be used as a reference for managers in implementing marketing management strategies. This is also one of the considerations of this paper being arranged in a series of "continuing" in various perspectives, covering the concept of business buyer behavior and marketing mix. In this series the focus is deepening the P of products as an effort to identify the opportunities for success of new product strategies in the practice of competition in the FMCG market.

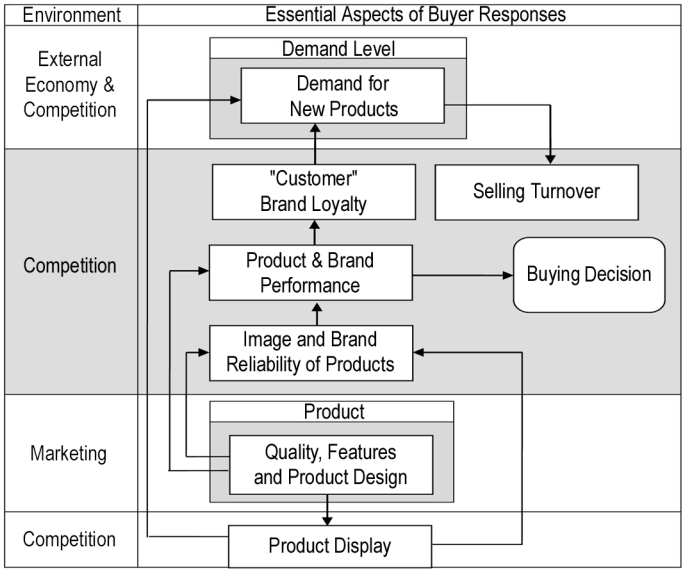


Figure 1. Model of New Product Performance & Brand Analysis in the Business Buyer Behavior
Source: Trihatmoko's research report (2016)

2. Literature Review

This business buyer behavior study uses the relationship marketing theory approach with the characteristics of direct relationship marketing, and is based on the agency theory perspective in the field of marketing management (Bergen et al., 1992; Trihatmoko et al., 2018). In agency theory, relationship and transactional between agents namely distributors with wholesalers as a form of realized outcomes from the efficient contract between distributors and their principals (Riswanto et al., 2018; Trihatmoko et al., 2018). Deepening the product mix in business buyer behavior is part of the supplier's marketing strategy policy that refers to the marketing mix concept (Hankansson and Waluszewskie, 2005; Sarangapatani and Mamatha, 2008; Jia Hu, 2011; Trihatmoko et al., 2016; Tantra, 2018).

The process of drafting a research conceptual framework of Trihatmoko (2016) has reviewed various literatures and described as in the following explanation. The influence of the marketing environment covers aspects of the marketing mix variable on product, price, distribution and promotion (Kotler and Armstrong, 2013). Hankansson and Waluszewskie (2005) suggest that not only products are always the center of attention but also how products with their facilities are linked among others in the form of prices and promotions, as well as important organizational resources, such as the personal purchasing department. Jia Hu's study (2011) shows that marketing mix strategies have a positive and significant relationship to customer loyalty. Johnston and Lewin (1996) identified that sales characteristics in the form of price, product, quality, service and image influence the role of decisions at the stages of the decision process, among others, namely bidding and supplier selection. The marketing mix's strategic policy content is aspects of the wholesale external economic environment which are outputs of environmental variables (Dwyer and Welsh, 1985; Handayani, 2018).

Products in the concept of marketing mix development are divided into three levels, namely core product, actual product and augmented product (Kotler and Armstrong, 2013). The literature explains that the product performance includes quality attribute, the product's features and design itself, and the brand in which the attributes of a name, term, sign, symbol or design attribute. Kotler and Armstrong (2013) stated that in developing a product, marketing agents must first determine the level of product quality to support the position on the target market. The study from Sarangapatani and Mamatha (2008) explain that the interaction between expectations and product performance is actually customer satisfaction or dissatisfaction. Customers will use product performance in terms of considering product quality, such as manufacturer's standard levels and specific product attributes (Beneke et al., 2013).

The results of the literature review in Trihatmoko's (2016) study provide an understanding that the product conception and marketing mix itself is only a description or has not been constructed in the business buyer behavior. The theoretical impact on scattered product strategies has been tried to be collected and constructively assembled in the study. In this paper the literature review above needs to be re-edited so that the complexity of the concepts from this study is easily explored for the benefit of future researchers. As in the introduction, it was stated that this study was to follow up on the results of the Trihatmoko (2016) study, which found that the performance of products and brands was one of the elements that dominated the purchasing decision process for buyers. The results of Trihatmoko's (2016) study have proposed the concept of product analysis within the business buyer behavior, among others, finding that quality determination, product features and design policies determine the performance of products and brands (Figure 1).

3. Methods

To be able to meet the expectations of the results of this study, the study approach uses a combination of methodological and technical qualitative research. The methodology of qualitative research provides extensive return to using a combination of research strategy approaches, as well as its philosophical interpretation approach (Proctor, 2005; Creswell, 2009; Jongker & Pennink, 2010; Kalu & Bwalya, 2017). The research framework in this study is indirectly related to Trihatmoko's paper and Partner's paper on their paper on FMCG marketing, that Trihatmoko (2016) found research using a phenomenology approach and interpreted it using a constructivism approach. Data collection and processing techniques, as well as the implementation of data validation procedures are in accordance with the focus and implementation of each research by applying phenomenology and grounded, as well as constructivism and pragmaticism (Taylor et al., 2016; Fatchan, 2011; Gupta and Awasthy, 2015; Jonker and Pennink, 2010) Creswell (2013) explained how the implementation of research with a grounded theory approach and its interpretation is combinative to obtain findings that in this case determine the success of new products.

4. Results

Deepening analysis is oriented to theoretical product strategy through a butt-up process, so that the concepts built are comprehensive and holistic in three perspectives, namely: (1) new product analysis and business buyer behavior, and (2) product strategy performance; and (3) the success of the product strategy.

4.1. Analysis of New Products and Business Buyer Behavior

Product evaluation is a process of purchasing decisions by buyers, when they conduct supplier analysis, with a decision-making process. Buyers assess products using their perceptions of the products offered by suppliers. Then at the supplier evaluation stage, the buyer considers one of the marketing environment factors, namely the strategic policy of the new product set by their supplier. These findings suggest that the marketing environment of "products" does not directly determine purchasing decisions, but is mediated by product & brand performance which are the outcomes of a product strategy. While the description is the performance of the product and brand new product determines the purchasing decision that will be determined by the buyer. Buyers carry out an analysis of product & brand performance to estimate prospective rounds of product sales in market competition. This is also related to a consideration, namely the assessment of brand loyalty by buyers and consumers. Furthermore, the identity of brand loyalty in business market purchasing decisions is in the position of the customer and consumer point of view. Brand loyalty will determine the level of product demand which will ultimately lead to the level of selling turnover of the product. Product demand creation can also be built from product display activities, meaning that a product strategy is designed to be easily displayed in the store. The textual description of the product above has been structurally described in the Trihatmoko (2016) research report in the form of minor propositions (Table 1).

No.	Propositions
1	Evaluation of the performance of the product and brand of new product determines the purchasing decision.
2	Evaluation of product quality, features & design relates to brand image analysis & reliability
3	Evaluation of product quality, features & design relates to the performance evaluation of products and brands
4	Analysis of brand image and reliability relates to the performance evaluation of products and brands.
5	Display of products is analyzed based on product features and design
6	Display of products can build brand image and reliability
7	Product and brand performance relates to customer and consumer loyalty to a brand
8	Brand loyalty from customers and consumers is related to estimates of the demand for new products

Table 1. Minor propositions of the relationship between product attribute evaluation and purchasing interest behavior

The marketing environment that stimulates purchasing decisions is the product strategy policy by the supplier in terms of quality, features and product design. The product strategy policy will position the product in the competitive environment of customers and consumers, namely the image and reliability of product brands and product displays, and brand loyalty of "customers". The environmental content of the competition will be the response of the buyer's consideration in the purchasing decision. In addition, the competitive environment will create competitive market demand for the product itself as a prospective level of sales of new products in a competitive environment. The competition perspective can be grouped into two namely customer competition in the form of product activities and existence and market demand in the form of product demand (Figure 2).

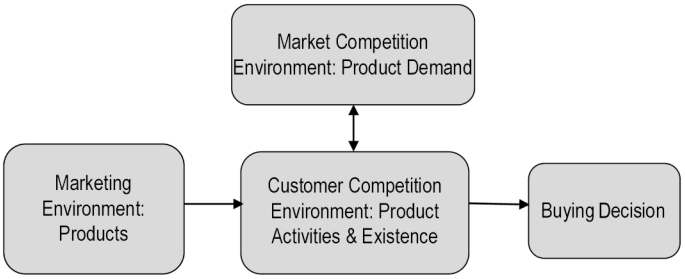


Figure 2. Product-marketing Environment and Competition in the Business Buyer Behavior

Based on these descriptions, the major proposition can be formulated in this study, as well as described constructively in Figure 2.

P1: The marketing environment about product strategy by suppliers will determine the "customer and market" competitive environment of the product itself.

P2: Customer competition environment in the form of product activities & existence is a consideration that will determine the purchasing decision by the buyer.

P3: The customer competition environment will drive the market competition environment regarding product demand.

P4: The sustainability of the market competition environment will determine the customer's competitive environment again.

4.2. Product Strategy Performance

The conceptualization of product and environmental analysis above (Figures 1 and 2) is a phenomenological behavior of buyers, so this is the first perspective of this study. In behavioral theory, it can be explained that behavior is a "cognitive" experience as a person every so often because of the accumulative action of one's own environmental stimulant. Thus, it can be assumed that the "wholesale" buyer behavior is built in cognitively because they are aroused by the supplier "marketer" in carrying out their daily business. For this reason, the meaning behind buyers' behavioral phenomena can be abstracted "bottom up" towards the product strategy process made by principals while repeating their customers in very long timeframes. Perceptive behavior becomes the action perspective of the "marketer" stimulus makers in this paper using a grounded-contructivist approach. The results of methodological analysis will lead to the interpretation of the performance findings of a new product strategy in two philosophical assumptions in the business market competition and general market competition. Both of these interpretations are meant that the conceptualization of the results of the business studies of buyer behavior can be viewed analytically in various perspectives on theoretical interests.

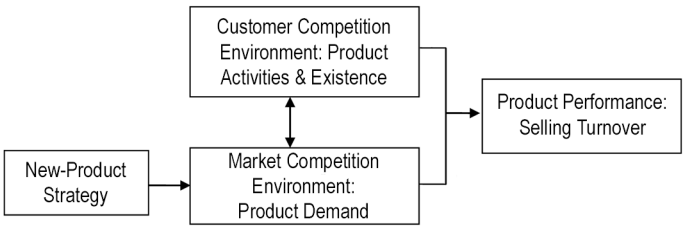


Figure 3. New Product Strategy Performance in Business Market Competition

The first interpretation, the buyer's decision to buy or refuse to buy a new product is the performance of the new product strategy at the first level. New product performances are likely to make an effort to realize products entering the market through wholesalers as intermediary customers. The findings of the study ahead have identified that buyers' decision to "buy or reject" is determined by product stimulation in a position in the

environment of market competition and customer competition. Analogically, it can be explained that each product transaction at the supplier's initial offer "distributor: to" wholesale "buyers, it will determine the level of product sales of the supplier. That is, the more wholesalers who buy new products will increase distributor sales, or vice versa. However, whether wholesalers will repurchase, it will depend on the level of product sales in their stores later. The rate of rotation of sales at wholesale stores to their customers depends greatly on the competitive environment. This textual description can be structurally structured into a major proposition about the performance of the first level new product strategy, namely in the business market environment and shown in Figure 3.

P1: New-product strategies will have an impact on the customer and market competition environment.

P2: The environment of market competition and customer competition will have an impact on the performance of the new product strategy.

P3: The customer competition environment and the market competition environment are mutually related.

The second interpretation, the frequency of repeated product purchases by wholesale shop customers is the performance of the new product strategy at the second level. This means that the frequency of product purchases by customers (retailers and consumers) will automatically have an impact on the frequency of buyers to order products back to their suppliers. At the second level of performance of the new product strategy, selling turnover will occur for wholesalers and distributors, as well as automatically to the manufacturers themselves. For this reason, the overall product-new strategy flow in the end is the achievement of selling turnover for the future, so that the product is in an established and strong position to compete in the market. Thus, by using the grounded theory, it will direct that the product strategy applies in general, namely for the strategy of new products or existing products that compete in the whole market (Figure 4). For this reason, the concept in Figure 4 is a universal concept for product strategy, and in terms of all-market competition or not just in the business market.

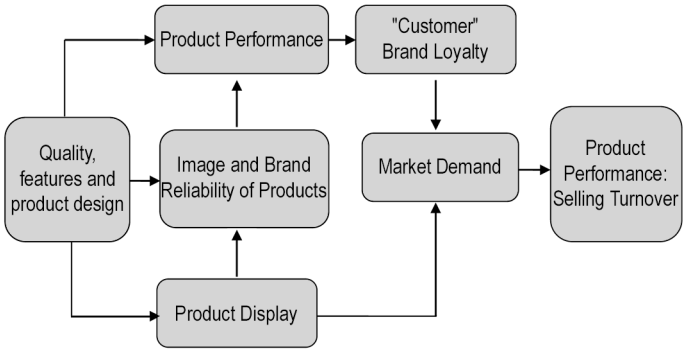


Figure 4. Product Strategy Performance in All-Market Competition

4.3. The Success of the Product Strategy

The final stage of conception of the business buyer behavior and P of products in this paper is to reveal the extent to which the success of a product strategy itself is "successful or failed". To find out whether a product will succeed or fail, the methodological choice of the study is to use a grounded theory and conditional martic approach. Data analysis uses a theoretical review in Figure 4, because it has described the conception of product strategy performance in all-market competition. Analogically the concept can be grouped into four theoretical sides as a strategic focus, namely: (1) the accuracy of the quality, features and designs set by marketers (2) the situation of competition in all markets, namely market demand (3) customer competition assessment, product performance and brand (3) all-market competition namely selling turnover that is repeated on an ongoing basis. The analysis of these focus themes can be interpreted that holistically determines the success of a product strategy in the whole-market competition. In this case, it is not only for new products, but also for all products that exist in the market. Furthermore, matrix analysis is formulated by simultaneously aligning between 4 (four) variables, each of which is directly related in two groups, namely: (1) product quality variables, product features and product design directly related to product and brand performance; and (2) market demand variables with selling turnover of products.

After the conditional-matrix is arranged, it is then interpreted to estimate the conditions of a product strategy after competing in the market. Findings in the conditional matrix as shown in Figure 5, that is, the success of a product strategy are clearly evaluated, that is successful (Quadrant III) or failed (Quadrant I), and can be expected to succeed (Quadrant II) and will likely fail (Quadrant III). The products successfully competing in the market are indicators of quality, features and product design, as well as product and brand performance, market demand and selling turnover for each of the best or optimum lines or lines. In contrast, for failed products, all indicators will be at the worst or minimum point or line. Meanwhile, the next interpretation of the product in the position of likely to fail or will likely succeed, each has a realistic argument both for a new product and product that already exists in the market.

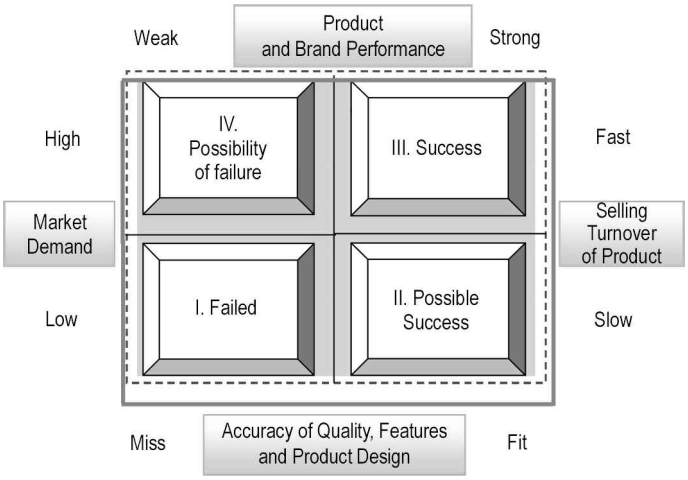


Figure 5. The Success of Product Strategy in All-Market Competition

The product tends to the possibility of failure, because the performance of products and brands is weak due to errors in quality, features and product design. The conditions of market demand and high sales do occur, but this is done still at selling turnover – I, or product sales still stop the group of traders or have not repeated it on end users. Phenomena in the market, for example: (1) indicated by the aggressiveness of new product launches by large companies; (2) existing products but are less aggressive with competitors' marketing strategies; or other factors.

The product tends to the possibility of success, because it has the density of quality, features and product design, so that it has produced strong product and brand performance. The conditions of market demand and sales are indeed low, but the strength of the performance of products and brands will be the best capital in competition. Phenomenon in the market, for example: (1) companies that already have many brand families are carrying out product launches as a result of line extension strategies or brand extensions; (2) existing products but these products are not positioned to capture the market, but only complement the products and brands to support the main products.

5. Conclusion

The findings of the study through constructivism interpretation show that the determination of producer strategy policy about a new product in brand strategies to achieve performance

that is selling turn over of product. Secondly, product sales performance (new or existing) will be achieved through product capabilities in customer competition and market competition. In summary, new products which will then "be able or failed" to compete competitively in the market are the result of establishing brand strategies. The four-dimensional matrix formation as shown in Figure 5 leads pragmatism to the second conclusion, namely the success and failure of products in the market in an effort to improve product and brand performance, create customer and market demand, and achieve selling turnover of products depends largely on the quality, features and product design. As a note, the determination of quality, features and product design in a product's strategy will certainly be related to each price, place and promotion strategy, because it is integral that the product mix strategy is part of the marketing mix.

The results of the study directly contribute to the concept of business buyer behavior, and marketing mix "product" related to brand strategies set by the company. Marketers in determining every choice of brand strategies (line extensions, brand extensions, new brands, or multi brands) are recommended to pay attention to factors that are included in business market behavior or new product performance variables so that the products created can succeed in customer and market competition. This is important, because if a new product fails on the market it is estimated that it will have an impact on the performance of products and brands that have a good performance. Conversely for new products that have succeeded in the market, marketers are advised to be careful when going through changes or improvements in quality, features and product design. For buyers as business traders, namely wholesalers and retailers, including distributors, they are recommended to selectively receive products that enter the market by assessing the performance of products and brands for each product offering from suppliers. This is intended so that the products traded can later accelerate business, or not interfere with products that have characteristics of fast moving. Recommendations for marketers and buyers are phenomenologically directing advice to consumers not to hesitate to try to use/consume new products, because it can be estimated that the product has a good performance. However, the sustainability decision, using the product fully will be determined by the satisfaction level of the consumers themselves.

References

[1] Beneke, J., Flynn R., Greig T., & Mukaiwa, M. (2013). The Influence of Perceived Product Quality, Relative Price and Risk on Customer Value and Willingness to Buy: A Study of Private Label Merchandise. *Journal of Product & Brand Management*, 22(3), 218-228.

[2] Bergen, M., Dutta S., & Walker, Jr. O. C. (1992). Agency Relationships in Marketing: A Review of the Implications and Applications of Agency and Related Theories. *Journal of Marketing*, 56(3), 1-24.

[3] Chang, H., & Chung (2008). The Antecedents and Consequences of Brand Equity in Service Markets. *Asia Pacific Management Review*, 13(3), 601-624.

[4] Creswell, J. W. (2009). *Research Design. Qualitative, Quantitative and Mixed Methods Approaches*. Third Edition SAGE Publication.

[5] Creswell, J. W. (2013). *Qualitative Inquiry & Research Design: Choosing Among Five Approaches* (3rd ed.). SAGE Publication.

[6] Dwyer, F. R., & Welsh M. A. (1985). Environmental Relationships of the Internal Political Economy of Marketing Channels. *Journal of Marketing Research*, 22(4), 397-414.

[7] Evans, J. R., & Berman, B. (1992). *Marketing*. New York, USA: Macmillan Publishing Company.

[8] Fatchan, H. A. (2011). *Metode Penelitian Kualitatif*. Jenggala Pustaka Utama, Surabaya, Indonesia.

[9] Gupta, R. K., & Awasthy, R. (2015). *Qualitative Research in Management*. SAGE Publications India Pvt Ltd., New Delhi, India.

[10] Hakansson, H. & Waluszewski, A. (2005). Developing a New Understanding of Market: Reinterpreting The 4Ps, *The Journal of Businness & Industrial Marketing*, 20(2/3), 110-117.

[11] Handayani, N. D. (2018). Muslim students' awareness on halal products: A study in a non-Islamic country. *Arthatama Journal of Business Management and Accounting*, 2(1).

[12] Jia Hu, Y. (2011). How Brand Equity, Marketing Mix Strategy and Service Quality Affect Customer Loyalty: The Case of Retail Chain Stores in Taiwan, *The International Journal of Organizational Innovation*, 4(1).

[13] Johnston, W. J., & Lewin, J. E. (1996). Organizational Buying Behavior: Toward an Integrative Frame Work. *Journal of Business Research*, 35(1), 1-15.

[14] Jonker, J., & Pennink, B. (2010). *The Essence of Research Methodology*. Springer, Berlin, Germany.

[15] Kotler, P., & Armstrong, G. (2013). *Principles of Marketing*. Pearson Education Limited, Harlow, England.

[16] Lewin, J. E., & Donthu, N. (2005). The Influence of Purchase Situation on Buying Center Structure and Involvement: A Select Meta-Ananlysis of Organization Buying Behavior Research. *Journal of Business Research*, 58(10), 1381-1390.

[17] Nijssen, E. J., & Agustin, C. (2005). Brand Extension: A Manager's Perspective. *Journal of Brand Management*, 13(1), 33-49.

[18] Peter, J. P., & Donnelly, Jr. J. H. (2011). *Marketing Management*. The McGraw-Hill Companies, Inc., New York, USA.

[19] Proctor, T. (2005). *Essentials Marketing Research*. Pearson Education Limited, Harlow, England.

[20] Riswanto, A., Saribanon, E., & Gaffar, V. (2018). The importance of the cultural and gender outlook on consumer behavior studies: An Indonesian perspective. *Arthatama Journal of Business Management and Accounting*, 2(1).

[21] Sarangapani, A., & Mamatha, T. (2008). Rural Consumer Behavior with Regard to Selected FMCG Consumption Patterns and Brand Usage: A Study. *Journal of Brand Management*, 5(3), 22-61.

[22] Sashi (2009). Buyer Behavior in Business Markets; A Review and Integrative Model. *The Journal of Global Business Issues*, 3(2), 129-138.

[23] Silva, R.d., Davis, G., & Naude, P. (2002). Assessing the Influence of Retailer Buyer Variables on The Buying Decision-Making Process. *Europen Journal of Marketing*, 36(11/12), 1327-1343.

[24] Solomon, M. R. (2013). *Consumer Behavior*. Pearson Education Limited, Harlow, England.

[25] Steenkamp, J-B. E. M., & Dekimpe, M. G. (2009). *Marketing Strategies for Fast Moving Consumer Goods*, Business and Economics. Retrieved from: http://search.proquest.com/docview/229148691?accountid=44945

[26] Tantra, A. R. (2018). Factors influencing the disclosure of intellectual capital: Examining the role of company age and some financial performances. *Arthatama Journal of Business Management and Accounting*, 2(1).

[27] Taylor, S. J., Bogdan, R., & DeVault, M. L. (2016). *Introduction to Qualitative Research Methods*. John Wiley & Son, Inc. Canada.

[28] Trihatmoko, R. A. (2016). *Proses Keputusan Pembelian Produk Baru oleh Grosir Industri Fast Moving Consumer Goods (FMCG) di Pasar Tradisional*. Disertasi Pascasarjana Program Studi Doktor Ilmu Ekonomi, Universitas Sebelas Maret, Surakarta, Indonesia.

[29] Trihatmoko, R. A., Mulyani, R., & Lukviarman, N. (2018). Product Placement Strategy in the Business Market Competition: Studies of Fast Moving Consumer Goods. *Business and Management Horizon*, 6(1), 150-161.

[30] Trihatmoko, R. A., Harsono, M., Wahyuni, S., Haryono, T., & Lukviarman, N. (2018). Structure of Channel Management and Agency Theory: Relationship Marketing Approach for Fast Moving Consumer Goods (FMCG) Business. *Research in Business and Management*, 8(2), 25-37.

[31] Trihatmoko, R. A., Harsono, M., Wahyuni S., & Haryono, T. (2016). The Confine of Efficient Contract Between Principals and Distributors Perfectly Control of Marketing Mix Strategies: Channel Management Perspective of Fast Moving Consumer Goods (FMCG) Industries in Indonesian. *International Journal of Research in Commerce, Economics & Management*, 6(9), 31-36.

[32] Tuominen (1999). *Managing Brand Equity. Turku School of Economics and Business Administration*. Retrieved from: https://pdfs.semanticscholar.org/5a49 /dfc627a8ce55369687bc53c17b06c84e5252.pdf

[33] Wilkie, W. L. (1990). *Consumer Behavior*. John Wiley & Sons. Inc. Canada, USA.

Establishing a Quality Planning Scheme with Kano Model and a Case Study

Dinmukhamed KELESBAYEV[1], Zhanar ALIBEKOVA[2], Bibigul IZATULLAYEVA[3], Botakoz DANDAYEVA[4], Gulmira MOMBEKOVA[5], Lesbek TAIZHANOV[6]

[1]Corresponding author, PhD, Associate Professor of Khoja Akhmet Yassawi International Kazakh-Turkish University, B.Sattarkhanov avenue, 29, 161200 Turkestan, Kazakstan; E-mail: dinmukhamed.kelesbayev@ayu.edu.kz
[2]PhD Student of Khoja Akhmet Yassawi International Kazakh-Turkish University, B.Sattarkhanov avenue, 29, 161200 Turkestan, Kazakstan; E-mail: zhanar.alibekova@ayu.edu.kz
[3]D.Sc., Associate Professor of Khoja Akhmet Yassawi International Kazakh-Turkish University, B.Sattarkhanov avenue, 29, 161200 Turkestan, Kazakstan; E-mail: bibigul.izatullayeva@ayu.edu.kz
[4]D.Sc., Associate Professor of Khoja Akhmet Yassawi International Kazakh-Turkish University, B.Sattarkhanov avenue, 29, 161200 Turkestan, Kazakstan; E-mail: botakoz.dandayeva@ayu.edu.kz
[5]PhD, Assistant Professor of Khoja Akhmet Yassawi International Kazakh-Turkish University, B.Sattarkhanov avenue, 29, 161200 Turkestan, Kazakstan; E-mail: gulmira.mombekova@ayu.edu.kz
[6]PhD, Assistant Professor of Khoja Akhmet Yassawi International Kazakh-Turkish University, B.Sattarkhanov avenue, 29, 161200 Turkestan, Kazakstan; E-mail: lesbek.taizhanov@ayu.edu.kz

Abstract

This study is intended to apply in universities Quality Planning Scheme approach integrating with Kano Model to propose a new integrated approach in order to optimize customer-focused service design in education, and to improve the quality of education. In this context, redesigning of the concept of service in universities and educational services provided there, considering student requests and needs and improvement of quality is discussed. Therefore, this study, to better understand conceptually and theoretically customer needs include the Kano Model and Quality Planning Scheme in order to develop the services to meet the customer needs in the most appropriate way. In addition, as a practical development of new integrated approach of educational institutions at the highest level which take place in university applications and as a customer of the university in the various customer groups only includes students as a basic customers. In this study, the methodology for the structure of the sample to determine the purposeful sampling of the types of "quota sampling" method, data collection techniques, as a qualitative research technique gemba and focus group studies, survey as a quantitative research technique was used.

Keywords: *quality management; quality of education; educational services; quality planning scheme; Kano Model; student needs.*

1. Introduction

It is commonly known that, the ultimate aim of Modern Quality Function Deployment (here in after QFD) is customer satisfaction. It is thought that every need related to product or service in traditional QFD approach will have the same effect on customer satisfaction. However, in the formation of customer satisfaction, all needs cannot have the same relation or some proportion. Here, the nature of each customer need should be understood and classified accordingly. Therefore, one of the main characteristics of the modern QFD approach is that it focuses more on the process of determining customer requirements and needs (Johnson and Mazur, 2008: 26). One of the approaches used in this direction is Kano Model (here in after KM). This model reveals the relationship between the degree to which a business meets a customer needs and customer satisfaction (Matzler and Hinterhuber, 1998: 28). Therefore, the use of KM in the construction of Quality Planning Scheme in the KFD process will enable the implementation to be made at a higher level and more efficiently and to increase the total customer satisfaction more effectively.

1.1. Aim

The aim of this research is to propose a new integrated approach by integrating the Quality Planning Scheme of the modern QFD approach with KM to optimize the customer-oriented service design in education and to improve education quality by applying the proposed approach at universities. Within this framework, the service concept of the universities and the education services given in these areas were redesigned and the quality was improved by taking into consideration the wishes and needs of the students.

1.2. Scope

In order to better understand the customer requires conceptually and theoretically, this study includes the incorporation of QFD and QM into the Quality Planning Scheme, used to develop the services that best meet customer needs respectively. In addition, the new integrated approach, which has been developed as an application, covers only the students in the universities that are at the highest level of the educational

institutions and the students as the main customer from the various customer groups in the universities (faculty staff, students, country, government, employers, parents etc.).

2. Literature Review and Conceptual Background

2.1. Quality Function Deployment Process

Various definitions were given by different authors and scholars on the QFD method. For example: Hauser and Clausing (1988: 64) QFD defined it as "the product which customers want to buy or the products they want to continue buying or service design, to focus on the ability of the company for the production and marketing; and it is a planning and communication method for coordinating these capabilities". Akao, who finds this concept (1990: 3), explains the QFD as "the quality of design that transforms the basic quality assurance point of customer, is demands of customers aimed to provide satisfaction to be used in the design targets and manufacturing phase development method". Guinta and Praize (1993: 5), while referring to the impact of the effective use of QFD describe it as "the logical system defining the things what customers want, listen to their wishes carefully and to face the best way to available resources". From this definition QFD can be seen, the input in order to enhance competitiveness and create the needs of customer requests, the process is a flexible and easy to understand. The main objective of this process is to satisfy the customer.

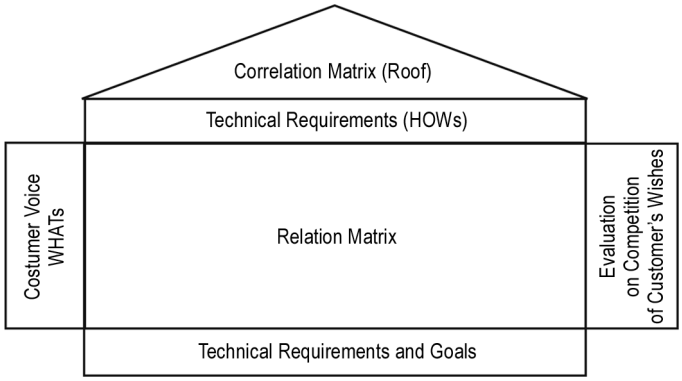


Figure 1. House of Quality
(adapted from Hauser and Clausing, 1988: 11-12)

In the literature, a large number of applications can be based for their different characteristics in different areas are QFD model. These models are created, not intended to be applied one to one of any model. One of the QFD application model based on them, depending on the characteristics of the area being redefined matrix presented in this model, some of the matrix by removing or changes can be made adding new matrix model (Kelesbayev et al., 2016: 570). Therefore, only the underlying structure of the Quality House matrix which formed the main structure of QFD process is given in university implementation. The general structure of House of Quality is presented in Figure 1 (see Figure 1). The essential elements of House of Quality used in this application and processing steps are given in the following (Chan and Wu, 2002: 26-27):

- Customer Voice (*WHATs*): Customer voice, also referred to as WHATs is the starting point of QFD process. The customer demands and requirements determined by a variety of methods previously carried out in market research are listed in this part of House of Quality. The reason of considering it as the most important steps of QFD process is that the step is to provide input into the process.
- Technical Requirements (*HOWs*): One kind of the section where the customer's voice is compiled is performed in this section, where the voice of inner processes is taken into consideration.This section is also called technical language or inner voice of business.
- Planning Matrix (Evaluation on Competition of Customer Requests): The Quality department is located on the right side of the House and is a tool that helps customers prioritize requests QFD team. This matrix contains numeric data associated with each customer request. This section includes such information as point of sale evaluation and improvement rates.
- Relationship Matrix: This section shows relationship between technical requirements and customer's voice from the perspective of QFD team. Relations are given in three ways as weak, medium and strong.
- Correlation Matrix (*ROOF*): This section studies the effects of technical requirements to each another. The target of this matrix is to determine whether there are positive and negative affect between identified technical requirements.
- Benchmark Technical Evaluations (Evaluation of Technical Requirements on Competition and Goals): With the help of this section we can make the decision on technical features to which attention should be given priority or specifications in data scanning. In addition to it some benchmarking, evaluations and targets for technical requirements are also included in this section.

2.2. Kano Model

Kano Model (see Figure 2) was developed in 1984 by Japanese professor Noriaki Kano and colleagues (Kano et al., 1984) to classify customer requirements. Professor Kano said that the quality requirements of products and services are not equal in the eyes of their customers (Tan and Shen, 2000: 1143). Kano Model reveals the relationship between the degrees to which functions meet customer requirements with customer satisfaction (Lofgren and Witell, 2008: 63). This model is that one, which identifies the reason of ordinary improvement of customer satisfaction level despite of big improvement in other customer requirements meet in contrast other customer satisfactions are extremely increased when a little improvement is provided in some customers, meet the needs (Dominici and Palumbo, 2013: 90).

As seen in Figure 2, the horizontal axis indicates how much successful the quality requirements of the product or service were in meeting customer expectations. If the axis moves to the right, it meets more the customer expectations of quality requirements; if it moves to the left, we can see that it meet less. In addition, vertical axis indicates customers satisfaction level related to products and services quality requirements. The more the axis moves upward, the more degree of customer satisfaction is high, the more the axes moves down, the more customer dissatisfaction is so high (Kelesbayev et al., 2015: 36).

Basing on the axis of Kano scheme, based on product or service quality requirements Kano Model divided into six separate categories and each of these six categories in a different way affected customer satisfaction. These are (Walden (Ed.), 1993: 3-35; Matzler and Hinterhuber, 1998: 28-30; Dominici and Palumbo, 2013: 90-91; Liu, 2013: 134-135):

- Must-be quality requirements (M): These requirements are the must-be criteria of products and services. If these requirements are not in the products and services, the customer will be extremely dissatisfied. On the other hand customers on products and services by seeing these requirements if the guarantee, it does not affect customer satisfaction. Therefore, these requirements only prevent customer dissatisfaction. For example, the restaurant is not clean, it causes on higher customer dissatisfaction, while being clean does not have any influence on customer satisfaction.

- One-dimensional quality requirements (O): These requirements are directly proportional with the level of how much these requirements are. The high level of requirements fulfillment gives a high level of customer satisfaction or vice versa. Customers often explicitly request these requirements. For example, a feature expected by the customer in a car, that a car mile of indicators (diesel or gas consumption) is good. Better km indicator provides customer satisfaction, while a worse km indicator leads to customer dissatisfaction.
- Attractive quality requirements (A): They have the greatest impact on customer satisfaction, quality requirements. This is not clearly stated by the customers' quality requirements and not expected. The fulfillment of these requirements provides more customer satisfaction. If these are not fulfilled, it leads to customer dissatisfaction. For example, when a car radio antenna turns off automatically the car customer feel high satisfaction, but does not descend into the car customer do not feel dissatisfaction. These requirements differ from the product stream and provide a competitive advantage.

In addition to these three main categories, there are three different quality requirements. They are indifferent. These are not the actual customer requirements can be referred to as the characteristic (Liu, 2013: 135-137).

- Indifferent quality requirements (I): Customer product or service is fully functional or dysfunctional, if not remain indifferent. Therefore, this requirement is not met does not make any sense for the customer, what is dissatisfied nor satisfied. For example, the cigarette lighter in a car that is not an important quality requirement.
- Reverse quality requirements (R): This needs to be in by customer's products they want and they expect the exact opposite at the same time of need. For example, in normal conditions, in terms of getting the sun in the winter when requesting a house overlooking the south side, facing north to the distractions of summerhouse are preferred.
- Questionable quality requirements (Q): This type of question quality requirements or wrongly stated or misunderstood by the customer is given an answer or unreasonable.

Figure 2. Kano scheme
(Adapted from Matzler and Hinterhuber, 1998: 29)

When we review the literature on the inclusion of KM in QFD process, there are some QFD applications with integrated KM. However, almost all of these studies have been shown to be Traditional Four-Stage QFD applied studies. For example:

Matzler and Hinterhuber (1998) proposed a KM-based methodology to determine the customer's requires and needs, and to configure these identified customer needs in different groups, and to assess their strategic importance by calculating customer satisfaction and customer dissatisfaction values. This developed methodology was realized by applying Kano Survey (here in after KS) to 1500 customers in the ski industry. He categorized the identified customer needs by constructing them in different groups, and this was later used as a basis for QFD analysis.

Sireli and other scientists (2007) developed this approach by incorporating a widely accepted scoring method and statistical significance test into the Matzler and Hinterhuber approach to combine the QFD and KM results. To demonstrate the usefulness of this approach, it was implemented in the Pilot Cabinet Weather Information System, which is part of NASA's Aviation Weather Information project.

Raharjo and others (2010) have integrated the KM and its dynamics into the QFD to design multiple products systematically in their work. They proposed a quantitative method to KM dynamics and to extend the method proposed by Sireli and others. (2007). This quantitative method is also shown by hypothetical examples on laptop multiple design.

Tan and Shen (2000) proposed an integrative approach, using different work, to use the QM in QFD matrix planning to help in understanding the customer needs accurately and in depth. They have developed a transformation function for each customer's need based on the use of this approach in the design and identification of good web pages and analysis of the KM. Thus, they have achieved the desired customer satisfaction performance by resetting the improvement rate of each customer requirement. It should be said here that this study was adapted from Tan and Shen's (2000) research.

A study similar to the work by Tan and Shen was conducted by Tontini (2003 and 2007). Tontini (2003), in his study, three customer satisfaction coefficients by introducing some proposed changes in KM. He then conducted a case study with clients of 200 banking services to demonstrate the implementation of proposed integrated approach. In his study, he identified the correlation between Keno Model and the modified Keno Model, and integrated the modified KM into the QFD planning matrix.

In his research in 2007, Tontini re-proposed weighted degrees of customer needs in the method proposed by him in 2003 by analyzing two QFD integrated in the literature and their pluses and constraints. Using this proposed integrated method to identify innovative features in the development process of a new oversized beer trophy, a case study was conducted with data collected from potential 289 customers.

Lai and others (2004) have developed a mathematical programming model with a case study on the personal computer design and products using KM and QFD for optimizing the design. They have integrated the KM into QFD by offering customer satisfaction and dissatisfaction values that reflect the contribution of different customer needs for customer satisfaction.

However, Lai and other researchers (2007) have further developed their traditional integrated approach by creating a mathematical programming model to develop new product design in computer technologies. But despite the use of customer satisfaction and dissatisfaction factors, they have noticed that different customer needs still affect customer satisfaction in a similar way to the linear pattern.

In fact, it will be understood from KM, the contribution to customer satisfaction varies according to the different dimensions of customer needs. The realization of customer needs and its relations with customer satisfaction, especially non-linear relationships, cannot be fully defined in traditional QFD models as well as in the approach of Lai and others. We may say that the reason for this is that many traditional QFD models consider and accept the total customer satisfaction as a linear contribution value function of different customer needs.

In the literature, in addition to the methods that integrate KM into QFD, there are also some studies which have added different techniques and methods to the advanced level. For example: All the techniques used in the new product development process, Mazur (1997) has done theoretical work with

integrative QFD and demonstrated it with examples. Raharjo and his friends (2007 and 2010) used the Six Sigma method in QFD process integrated with the KM, while Li et al. (2009) added Analytıcal Hierarchy Process (here in after AHP) method into QFD integrated with KM, Yeh (2010) added Fuzzy Integrals, Lin et al. (2011) added TRIZ modeling, Hsu et al. (2012) integrated the Gray Relational Analysis. In addition, Tan and Pawritra (2001) have added the SERVQUAL (service quality) model to QFD process integrated into KM.

However, there are also some studies in QFD methods integrated with KM described above to design and develop new or existing products in different areas, i.e. to improve and improve quality. For example: in computer technologies development (Raharjo, 2007), in determining the quality of different branded mobile phones and in improving their quality (Hsu et al., 2007), in determining and improving the potential vehicle qualities in the car industry in brand building (Yadav and Goel, 2008) in improving the quality of health services (Gupta and Srivastava, 2011), in logistic services development (Baki et al., 2009), in library designing (Garibay et al., 2010), in a good web page design for Internet users (Chaudha et al., 2011), mark value and brand relationships in increasing (Chang and Chen, 2011), improving the quality of retail stores (Bennur and Jin, 2012), improving banking service quality (Seyedi et al., 2012), in higher education (Pourhasomi et al., 2012), in working at the school workshop in stations design (Hashim and Dawal, 2012), in improving product quality and improvement in food industry (Sofyalioglu and Tunail, 2012), in improving the service quality in hotels (Gupta and Srivastava, 2012) and improving service quality in dormitories (Liu, 2013).

3. Application

The implementation of this study was carried out in Akhmet Yassawi International Kazak-Turkish University (here in after AYU) which is active institute in education sector. The aim is to assist in re-designing and improving the quality of AYU's education and training activities by taking into account the wishes and needs of the students. Here, although the practice is carried out for AYU, Mukhtar Awezov South Kazakhstan State University (here in after MAU), which is the leading university in the region where the university is located for competitive evaluations, has been included in implementation.

The research system; the survey was conducted in October and November 2018, where the survey was conducted as an example. In AYU, a total of 4 000 undergraduate students are studying in the scope of full-time education. In order to determine the sample of the study, quota sampling method was used. The reason for why quota sampling method is used – because this method is one of the most suitable methods for demonstrating, describing and comparing the characteristics of certain groups interested. As a result, the sample of the research; A total of more than 400 undergraduates are studying at the undergraduate level at the Faculty of Economics and Administrative Sciences.

As a result, 407 students from the Faculty of Economics and Administrative Sciences at AYU have received 400 students. The number of returned and available surveys was found to be 386. For competing evaluations, 210 questionnaires were used from the students of Faculty of Economics and Administrative Sciences.

3.1. Methods

For the methods followed in this study, quota sampling method was used to determine the structure of the sample, gemba and focus group studies from qualitative study methods as data collection techniques and questionnaire study from quantitative research techniques were used. In this study, gemba and focus group studies were used in determining the student needs related to quality elements that are important for university students and the quality of education services provided. Data on the identified needs were collected by the developed Kano Questionnaire (here in after KQ). The collected data was transferred to the computer environment and analyzed in detail by the MS Excel 2013 program and the Kano Evaluation Table (here in after KET). As a result, each quality element and each category of needs have been evaluated separately, their priority ranking is determined and classified according to the Kano Categories (here in after KC). Subsequently, individual parameters for each KC were determined and included in the Quality Planning Scheme of the QFD process. Then, by means of the matrices included in the Quality Planning Scheme, the analyzes and the evaluations and analyzes were made with competition comparisons on the basis of faculties and competing faculties.

3.2. Kano Questioannaire

Kano Questionnaire will be prepared in order to collect data on the quality requirements. Kano Questionnaire consists of two parts as functional and dysfunctional questions for each that is positive and negative (Walden (Ed.), 1993: 5). Table 1 presents an example of the Kano Questionnaire (see Table 1). However, we have developed this questionnaire by adding additional questions. As seen in Table 1, a question is given in two ways, including positive and negative, and five answer choices for each question. These answer choices mean as following: 1 – I like it, 2 – it should be, 3 – it does not matter, 4 – it is not bad yet, 5 – I do not like.

Students (386 students) of Economics and Administrative Sciences Faculty of AYU have been applied, and all of them were included. Questionnaire consists of two parts. The first department of students in the demographic characteristics belonging to the questions, while the second part group-centered

No.	Question				Answer		
1	Functional Quality Requirements (Positive)	How do you feel if your umbrella is quick to open?			1 – I like it 2 – It should be 3 – It does not matter 4 – It is not bad yet 5 – I do not like it		
	Dysfunctional Quality Requirements (Negative)	How do you feel if your umbrella is not quick to open?			1 – I like it 2 – It should be 3 – It does not matter 4 – It is not bad yet 5 – I do not like it		
	How important is your umbrella to open quickly?		Not at all important	Less Important	Important	Very important	Extremely Important
			1	2	3	4	5
	Customer Need	**Businesses to Compare**	**Satisfaction Levels**				
			Very bad	Bad	Middle	Good	Very good
	How does the umbrella open quickly?	Own Business	1	2	3	4	5
		Competitor 1	1	2	3	4	5
		Competitor 2	1	2	3	4	5

Table 1. Sample of The Improved Kano Questionnaire

work-studies obtained by the students of their educational services related to the quality requirements are met or not met in case they feel they have been asked.

In order to avoid confusing customers with a few questionnaires in practice, this competitive benchmark questions will be added into the KQ. In this way, they will all coexist as a whole. The last version of this extended KQ is shown in Table 1. With this improved KQ, it is necessary to select the competitors of the company before the competition can be carried out. In some cases, this can be difficult if there are many competitors. In these cases, the most important or the most important competitors or competitors in the market should be selected (Chan and Wu, 2002: 29). After the competition benchmarking survey is carried out, the statistical mode of the competition evaluations made by the customers is taken in the competition comparison columns in the Quality Planning Scheme.

3.3. Kano Evaluation Table

After determination of quality requirements related to the product or service and data collected requirements related to these requirements, each requirement will be defined what phase of Kano category it belongs, in other words they are classified. Quality requirements of each of the participants in the quastionnaire, two questions of Kano type (positive and negative) based on their responses are classified according to KET (see. Table 2). According to Table 2 of the quality, requirements, which are, belong to which categories. For instance; In Table 1, sample questions a customer positive for the question "1 – I like it," negative questions, "5 – I do not like answered," If such quality element categories according to Table 2 "O" is a category that is, the one-dimensional quality requirements in the category are included.

Quality Requirements of product or service		Dysfunctional Quality Requirements (Negative)				
		1 – I like it	2 – It should be	3 – It does not matter	4 – It is not bad yet	5 – I do not like it
Functional Quality Requirements (Positive)	1 – I like it	Q	A	A	A	O
	2 – It should be	R	I	I	I	M
	3 – It does not matter	R	I	I	I	M
	4 – It is not bad yet	R	I	I	I	M
	5 – I do not like it	R	R	R	R	Q
M = Must-be Quality Requirements, I = Indifferent Quality Requirements, O = One-dimensional Quality Requirements, R = Reverse Quality Requirements, A = Attractive Quality Requirements, Q = Questionable Quality Requirements,						

Table 2. Kano Evaluation Table
Reference: Walden (Ed.), 1993: 6; Matzler and Hinterhuber, 1998:32

3.4. Coefficients of satisfaction and dissatisfaction

Quality requirements for each category of evaluation enter the simplest way to answer that is the statistical mode; frequency analysis is based on evaluation and interpretation. However, different market segments have different requirements because it is usually in some cases can be assigned to a specific category of quality requirements are not clear (Kelesbayev et al., 2015: 38). In this case, may not be appropriate to use statistical mode. In such a case, satisfaction and dissatisfaction has been revealed that the coefficients (Walden (Ed.), 1993: 18). This is the case of the coefficients of formula (Matzler and Hinterhuber, 1998: 33):

$$Satisfaction = \frac{A+O}{A+O+M+I} \qquad Dissatisfaction = \frac{A+O}{(A+O+M+I)\times(-1)}$$

Here is:
A = Attractive Quality Requirements;
O = One-dimensional Quality Requirements;
M = Must-be Quality Requirements;
I = Indifferent Quality Requirements.

Coefficient of satisfaction with products or services meet the quality requirements an increase in customer satisfaction how the coefficient of dissatisfaction in the quality requirement is not met, the customer is an indicator of how much dissatisfaction will occur. The satisfaction coefficient is in the range from 0 to 1. A value closer to 1 greater impact on customer satisfaction and quality requirements contained in the mark of the bands, the coefficient is closer to 0 indicate a very small effect quality requirements. Likewise, the dissatisfaction factor -1 in the range of 0. Closer to -1, customer dissatisfaction marks a major impact on quality requirements in the bands, the coefficient is closer to 0 indicate that not lead to customer dissatisfaction (Matzler and Hinterhuber, 1998: 33).

3.5. Quality Planning Scheme

Quality Planning Scheme covers the competitive evaluation of customers' products or services by taking into account the products or services of competing companies that produce similar products or provide similar services (Chan and Wu, 2002: 26-27). Because customers here will evaluate the extent to which their products or services can meet their own needs. The QFD team will determine the strategic targets and point-of-sale purchase for businesses based on these customers comparative evaluations (Chan and Wu, 2002: 28-29). In this way, strategic priorities of customer needs will be determined by taking into consideration the strategic targets and point of sale enterprises.

From this perspective, Tan and Shen (2000) found out that the relationship between customer satisfaction and product performance differs from basic needs to attractive needs. They developed a new correction technique to form the planning scheme in the QFD methodology. Here, we put different weights according to the customer needs in each KC and the impact on the customer satisfaction (Tan and Shen, 2000: 1142). Therefore, in this study, the addition of KM to the planning scheme of QFD process will be done based on the correction technique introduced by Tan and Shen (2000). In other words, this addition will be made by selecting a conversion function according to customer needs in each KC as in given correction technique. This is because the relationship between product performance and customer satisfaction in this proposed KM is measured

Part	Name	Functions and Formulas
1	**Conversion Function**	***s = f (k, p)***
		s – Customer satisfaction rating p – product or service performance level k – Correction parameter for each Kano category
2	Relationship between product or service performance and customer satisfaction	***Δs / s = k (Δp / p)***
		Δs – small changes in customer satisfaction, Δp – Small changes in product or service performance k – Kano correction parameter, where k : for attractive needs k>1, for expected needs k=1, for main needs 0< k<1
3	**Customer Satisfaction**	***$s = cp^k$***
		c – fixed.
4	**Adjusted Feedrate**	***$D\dot{I}O = (N\dot{I}O)^{1/k}$***
		DİO – Adjusted Feedrate, NİO – Normal Progress Rate

Table 3. Functions and formulas to be used in the construction of the Quality Planning Scheme to be formed according to the Kano Model
Reference: Adapted from Tan and Shen, 2000: 1145

using a function and parameters appropriate to the parameters. This conversion function is shown in Table 3.

4. Findings

4.1. Findings of Gemba Analysis and Focus Group Studies

Before the visit to Gemba, the planning of these visits was made accordingly, when, where and how to visit the customers were determined. Pouliot (1992) is based on his research to identify the number of gemba visits to be made. According to the results of this study, 70% of customer needs could be determined with 10-12 gemba visits (Mazur, 1997: 5). Therefore, the number of gemba visits was determined as 10 in this study and 10 different locations were visited by the students in the university and faculty. In addition, gemba visit tables were prepared for easier analysis of these visits.

The focus group studies were applied to 1st , 2nd, 3rd and 4th grade students studying in 6 undergraduate programs within the Faculty of Economics and Administrative Sciences at AYU. 6 undergraduate programs in each class, each of which consists of 1 girl and 1 boy student from each program (with each class separately) focus group study (12 students: 6 boys and 6 girls) it is made. Each focus group interviews lasted for 35-40 minutes.

As a result of Gemba visits and focus group studies, the needs of the QFD team were determined by the education and services received by the students and their needs related to their quality. These identified student needs were then gathered under 5 quality dimensions (see Table 4).

4.2. Findings of Improved Kano Questionnaire Study

The data on the identified needs were collected with the developed KQ and evaluated with Kano Evaluation Table and transferred to the computer environment. As a result of these evaluations, 9 of the total needs in the classification of student needs according to the KC's were determined as the needs that were expected to be basic, 15 were expected, 4 were attractive and 2 were indifferent needs (see Table 4). The prioritization of the needs here has been done with developed KQ as previously mentioned, i.e. their severity has been determined by improved KQ. Here, the arithmetic average of the answers given to each question is taken and the importance levels of needs are determined (see Table 5).

Quality Dimensions				Categories						Total	Categories	Satis-d Coefficient	Dissatis-d Coefficient	Total
No.	Primary	No.	Tertiary	M	O	A	I	R	Q					
1	Related to Features	1	SN1	90	217	65	10	2	22	386	O	0,738	-0,804	-0,070
		2	SN2	85	214	76	9	1	1	386	O	0,755	-0,779	-0,020
		3	SN3	222	88	62	12	2	0	386	M	0,391	-0,807	-0,420
		4	SN4	76	203	78	19	7	3	386	O	0,747	-0,742	0,005
		5	SN5	87	207	69	14	5	4	386	O	0,732	-0,780	-0,050
		6	SN6	184	104	88	8	2	0	386	M	0,500	-0,750	-0,250
2	Related to Academic and Administrative Staff	7	SN7	89	191	98	6	1	1	386	O	0,753	-0,729	0,023
		8	SN8	178	100	93	9	4	2	386	M	0,508	-0,732	-0,220
		9	SN9	102	176	95	11	2	0	386	O	0,706	-0,724	-0,020
		10	SN10	170	95	110	9	2	0	386	M	0,534	-0,690	-0,160
		11	SN11	165	112	87	18	2	2	386	M	0,521	-0,725	-0,200
		12	SN12	107	155	113	10	1	0	386	O	0,696	-0,681	0,016
3	Related to Courses and Exams	13	SN13	115	149	108	12	1	1	386	O	0,669	-0,688	-0,020
		14	SN14	74	50	75	172	13	2	386	I	0,337	-0,334	0,003
		15	SN15	58	98	211	15	3	1	386	A	0,809	-0,408	0,401
		16	SN16	148	123	102	9	2	2	386	M	0,589	-0,709	-0,120
		17	SN17	74	218	85	8	0	1	386	O	0,787	-0,758	0,029
		18	SN18	99	214	63	8	0	2	386	O	0,721	-0,815	-0,090
4	Related to Practice and Career	19	SN19	106	156	111	9	2	2	386	O	0,699	-0,686	0,013
		20	SN20	76	241	58	7	2	2	386	O	0,783	-0,830	-0,050
		21	SN21	263	72	44	3	3	1	386	M	0,304	-0,877	-0,570
		22	SN22	85	202	87	8	2	2	386	O	0,757	-0,751	0,005
		23	SN23	209	75	77	22	2	1	386	M	0,397	-0,742	-0,340
5	Qualifications and Opportunities	24	SN24	26	62	287	11	0	0	386	A	0,904	-0,228	0,676
		25	SN25	188	96	86	15	0	1	386	M	0,473	-0,738	-0,260
		26	SN26	80	48	78	180	0	0	386	I	0,326	-0,332	-0,010
		27	SN27	97	70	198	20	1	0	386	A	0,696	-0,434	0,262
		28	SN28	81	261	38	5	0	1	386	O	0,777	-0,888	-0,110
		29	SN29	84	197	90	14	1	0	386	O	0,745	-0,730	0,016
		30	SN30	30	63	287	6	0	0	386	A	0,907	-0,241	0,666

Table 4. Classification of student needs according to Kano categories

When the needs of Table 4 are analyzed, the distribution of statistical modes of other student needs can be understood as foolowing SN12 – polite and friendly treatment of administrative and student staff, SN13 – practicality of courses and content, SN16 – exam questions are consistent with each other. The statistical distribution of student needs is not clearly evident. Therefore, Coefficients of satisfaction and dissatisfaction of 30 requirements specified in order to eliminate such discrepancies are calculated here (see Table 4).

4.3. Findings of Quality Planning Scheme

As mentioned before, the quality planning scheme is based on KM. In other words, customer voice, its ranking and classification, Kano parameter and competitive comparisons were obtained with KM. The quality planning scheme is prepared according to KM, which is adapted to KM, presented in Table 5.

The data, developed for competitive evaluations, collected by the competitive benchmarking questionnaire in the KQ, was collected. Thus, by taking the statistical mode of competition evaluations made by the students, they are placed in the competition comparison columns in the planning scheme.

The point of sale points in the Quality Planning Schemes have been determined by considering the current situation of the university and the competing university by considering the needs of each student by QFD team. Because the progress in meeting the needs will be reflected in the sales activities of the students. If it is expected that the progress will not be reflected

No.	Classification	Ranking	Needs	Raw Importance Degree	Kano Categories	k Parameters	Competitive Comparison		Point of Sale Score	Targets	Normal Progress Rate	Adjusted Feed Rate	Strategic Importance of Degrees	
							AYU	MNU					Utter	Relative
1	Must-be quality requirements	1	SN8	4,056	M	0,5	4	4	1,0	5	1,25	1,56	6,33	3,60
2		2	SN3	4,054	M	0,5	3	3	1,0	4	1,33	1,77	7,18	4,08
3		3	SN6	3,944	M	0,5	4	4	1,0	5	1,25	1,56	6,15	3,50
4		4	SN25	3,667	M	0,5	2	4	1,0	4	2,00	4,00	14,7	8,35
5		5	SN10	3,611	M	0,5	4	4	1,0	4	1,00	1,00	3,61	2,05
6		6	SN16	3,595	M	0,5	3	4	1,0	4	1,33	1,77	6,36	3,62
7		7	SN21	3,457	M	0,5	3	3	1,0	3	1,00	1,00	3,46	1,97
8		8	SN11	3,432	M	0,5	2	3	1,0	3	1,50	2,79	9,58	5,45
9		9	SN23	3,351	M	0,5	4	4	1,0	4	1,00	1,00	3,35	1,91
10	One-dimensional quality requirements	1	SN7	3,919	O	1,0	3	4	1,25	5	1,67	1,67	8,18	4,65
11		2	SN13	3,833	O	1,0	3	3	1,25	4	1,33	1,33	6,37	3,63
12		3	SN9	3,806	O	1,0	4	3	1,25	4	1,00	1,00	4,76	2,71
13		4	SN1	3,730	O	1,0	4	4	1,25	5	1,25	1,25	5,83	3,32
14		5	SN17	3,694	O	1,0	3	4	1,25	4	1,33	1,33	6,14	3,49
15		6	SN5	3,686	O	1,0	3	4	1,25	4	1,33	1,33	6,13	3,49
16		7	SN12	3,605	O	1,0	3	3	1,25	3	1,00	1,00	4,51	2,56
17		8	SN29	3,556	O	1,0	2	3	1,25	3	1,50	1,50	6,67	3,79
18		9	SN2	3,541	O	1,0	3	4	1,25	4	1,33	1,33	5,89	3,35
19		10	SN19	3,541	O	1,0	3	4	1,25	4	1,33	1,33	5,89	3,35
20		11	SN28	3,459	O	1,0	2	3	1,25	3	1,50	1,50	6,49	3,69
21		12	SN18	3,417	O	1,0	3	3	1,25	3	1,00	1,00	4,27	2,43
22		13	SN20	3,333	O	1,0	4	4	1,25	4	1,00	1,00	4,17	2,37
23		14	SN4	3,278	O	1,0	3	3	1,25	3	1,00	1,00	4,10	2,33
24		15	SN22	3,278	O	1,0	3	4	1,25	4	1,33	1,33	5,45	3,10
25	Attractive quality requirements	1	SN27	4,105	A	2,0	2	2	1,5	4	2,00	1,41	8,68	4,94
26		2	SN30	3,743	A	2,0	2	4	1,5	4	2,00	1,41	7,92	4,50
27		3	SN24	3,526	A	2,0	3	3	1,5	4	1,33	1,15	6,08	3,46
28		4	SN15	3,361	A	2,0	3	3	1,5	4	1,33	1,5	7,56	4,30

Table 5. Quality Planning Chart according to Kano categories

in the sales activities then 1, it will be 1.25 if it is expected to be reflected in the middle level and 1.5 if it is expected to have a high level effect. Therefore, 1.5 points for attractive needs that are highly effective in increasing student satisfaction, 1.25 points for expected needs and 1 point of sale points for basic needs have been assigned.

While determining the targets, effective factors such as resource, cost, accessible technology and time are taken into consideration in addition to the university and the competing university. However, the importance of the raw importance of student needs was taken into account. Here, if the importance of students is not high, the target value is not as high as the position of the competitors. If this is the case, in other words, if the need for a particular student is very high, the situation of the business is perceived to be higher than the competing companies, although the target value is slightly higher. For example, it is seen that the attractive necessity, SN27, has a high significance level of 4,105 points and it is perceived as 2 points in the competition comparison and 2 points in the competitor. Therefore, the point of sale point of this need is 1.5 and the strategic target score is 4. The reason for this is that firstly the students should be given high attention to this need, to be perceived at the same level in the second competitor, and the third one is the effect of this need on increasing student satisfaction as attractive need. However, to achieve this goal and to achieve the desired customer satisfaction, the normal progress rate is calculated as 2, while the corrected progress rate is 1.41. When the calculated relative importance of this need is considered, it is seen that it is in the second place with 4,94 degrees which is very high compared to the relative needs of other needs. In addition, it is considered that this university is one of the student needs that should be emphasized in order to ensure total student satisfaction.

Normal progress rates in the Quality Planning Scheme reveal whether or not the university should increase its performance (the level of meeting the needs of the students) in order to achieve the determined strategic objectives, or to what extent it should increase if it is required. It is also used to prioritize the importance of assessments to at least be perceived as well as the competing university. These normal progress rates have been determined by dividing strategic goals by meeting the needs of the university. The fact that this ratio is equal to 1 indicates that there is no need to make progress in meeting this need. The main difference between the normal and adjusted progress rates shows the desired increase in the level of student satisfaction, while the second shows what needs to be done more to achieve the desired level of student satisfaction. Therefore, it will give the adjusted progress rate for what the KFY team really wants to know.

The strategic importance level consists of two levels of importance. These are absolute and relative importance degrees. Here, the absolute significance is obtained by multiplying the corrected feed rate, point of sale point and the raw importance. Relative significance will be found by normalizing the values in the column of absolute significance. It has the importance of the absolute importance of the customers and the importance that the enterprise gives to these customer needs. These degrees of importance will help to identify the needs of strategic importance for the university by integrating the needs of the needs with the university's objectives. In addition, these relative degrees of severity will be used to calculate the technical severity of technical requirements to be determined to meet student needs.

When the Quality Planning Scheme according to the Kano Categories in Table 5 is examined, it is determined that more changes have occurred. As the order of meeting the needs according to the KM is M> O> A, this will be sorted in these categories of needs. From this point of view, when the

importance level of the needs in the basic needs category is examined, it can be seen that SN25, which is in the fourth place with 3,667 degrees according to the raw importance level, comes to the first place with 8.35 degree according to the calculated relative importance level. In the second order, SN11, which is in eighth place with 3,432 degrees of crude importance, has 5.48 degrees of relative importance. This is followed by the requirements of SN3 and SN16 with the degrees of 4.08 and 3.62.

When the expected needs category is considered, it is seen that the order of the need for the first line of ODA is not changed, but that the level of raw importance, which is only 3,919, has changed to 4,65 relative importance level. SN13, which was the second with 3,833 degrees of crude importance, fell to the fourth place with 3.63 degrees relative to the relative importance. In the second and third ranks, the needs of SN29 and SN28, respectively, with relative proportions of 3.79 and 3.69, respectively, are included. These are followed by the requirements of SN17 and SNI5 with a relative significance level of 3,49.

Finally, when the importance of attractive needs is examined, it can be seen that the order of needs of the first and second courses is not changed, but only in the order of 4,95 and 3,743, respectively. This is because the position of the needs of SN24 and SN15 in the fourth row together with their importance has also changed.

Thus, after the planning scheme has been developed and evaluated in detail, the technical requirements for meeting the student needs obtained as a result of this planning plan should be determined by the QFD team after evaluating the deep discussions made with the faculty and university management taking into account all student needs.

5. Conclusions and Recommendations

In this study, which was prepared for the purpose of the study in the preparation of the Quality Planning Scheme of the KM and in order to optimize the customer-oriented service design in education and to improve the quality of education and to apply the proposed approach in universities, one of the most important customers of the training service from the point of view of the students, it was tried to show the quality elements that are important in higher education. Here, universities can reveal their differences thanks to the KM and become superior to their competitors in a rapidly developing competitive environment. With the findings obtained from the Quality Planning Scheme, which is one of the important stages of QFD, student requests and priorities can be determined, these existing ones can be restructured according to the determined requests and needs. Because these situations will lead to a continuous increase in total student satisfaction and a significant increase. However, because keeping the area of quality improvement work more narrowly will help to focus more on the voice of customers, in practice, only students are considered as customers and quality requirements for higher education are given in general. Therefore, this study will help the university and faculty management to guarantee and improve the quality of their education and training services and to develop and develop their own strategies and decisions accordingly. Thus, this study was successfully applied in the field of education by integrating KM and Quality Planning Scheme and it was concluded that customer voice is very important and useful in terms of better understanding and better reflecting to design process. However, it is naturally detected in some constraints. These:

The implementation of the Quality Planning Scheme integrated with the KM only makes it more difficult for the university to apply to the Faculty of Economics and Administrative Sciences. Considering the importance, characteristics and benefits of this study, it can be applied to other faculties or the whole university for different purposes. Thus, differences in the needs of other faculty students can be determined. In addition, since the results of QFD cannot be measured and calculated in a short time, it will help the faculty and the university to determine the current quality requirements.

The other constraints in this study are based on the students' needs only for the customer needs that will determine the quality requirements. Other families, community, employers, government, teachers and academic staff of the university. It is very important to take into account the demands and needs of its domestic and foreign customers, and will result in more accurate and more efficient results. In addition, by combining KM with traditional QFD models, it can be observed that the model and the method will yield more efficient and healthy results by comparing the results with the results of the modern PFM integrated with KM. Therefore, future studies will be more accurate in these directions. In addition, more detailed investigations can be made by using v together with other methods of improvement (example: AHP, Six sigma, SERQUAL, TRIZ etc.).

References

[1] Akao, Y. (Ed.). (1990). *Quality Function Deployment: Integrating Customer Requirements into Product Design*. (Translated by Mazur, G.H.). New York: Productivity Press, 370.

[2] Baki, B., Başfırıncı, C., Çilingir, Z. ve Murat, I. (2009). An Application of Integrating SERVQUAL and Kano's Model into QFD for Logistics Services. A Case Study from Turkey. *Asia Pacific Journal of Marketing and Logistics*, 21(1), 106-126.

[3] Bennur, S. and Jin, B. (2012). A Conceptual Process of Implementing Quality Apparel Retail Store Attributes: An Application of Kano's Model and the QFD Approach. *International Journal of Business, Humanities and Technology*, 2(1), 174-183.

[4] Chan, L. and Wu, M. (2002). QFD: A Comprehensive Review of Its Concepts and Methods. *Journal of Quality Engineering*, 15(1), 23-35.

[5] Chang, K. and Chen, M. (2011). Applying the Kano Model and QFD to Explore Customers' Brand Contacts in the Hotel Business: A study of a Hot Spring Hotel. *Journal of Total Quality Management*, 22(1), 1-27.

[6] Chaudha, A., Jain, R., Singh, A. and Mishra, P. (2011). Integration of Kano's Model into Quality Function Deployment. *International Journal of Advanced Manufacturing Technology*, 53(5-8), 689-698.

[7] Dominici, G. and Palumbo, F. (2013). "How to build an e-learning product: Factors for student/customer satisfaction". *Business Horizons*, 56, 87-96.

[8] Garibay, C., Gutierrez, H. and Figueroa, A. (2010). Evaluation of a Digital Library by Means of QFD and Kano Model. *Academic Librarianship*, 36(2), 125-132.

[9] Guinta, L. and Praizler, N. (1993). *The QFD Book: The Team Approach to Solving Problems and Satisfying Customers through Quality Function Deployment*. New York: AMACOM Books, 160.

[10] Gupta, P. and Srivastava, R. (2011). Customer Satisfaction for Designing Attractive Qualities of Healthcare Service in India Using Kano Model and QFD. *International Journal of Mechanical Engineering*, 1(2), 101-107.

[11] Gupta, P. and Srivastava, R. (2012). Analysis of Customer Satisfaction of the Hotel Industry in India Using Kano Model & QFD. *International Journal of Research in Commerce, IT & Management*, 2(1), 74-82.

[12] Hashim, A. and Dawal, S. (2012). Kano Model and QFD Integration Approach for Ergonomic Design Improvement. *Procedia – Social and Behavioral Sciences*, 57, 22-32.

[13] Hauser, J. and Clausing, D. (1988). The house of quality. *Harvard Business Review*, 66(3), 63-73.

[14] Hsu, C., Chang, A. and Kuo, H. (2012). Integrating Grey Theory into Kano's QFD Based on Data Mining to Enhance Supply Market Survey with Purchasing. *WSEAS Transactions on Information Science and Applications*, 9(2), 37-47.

[15] Hsu, C., Chang, T., Wang, S. and Lin, P. (2007, June). Integrating Kano's Model into QFD to Facilitate Decision Analysis for Service Quality. *Proceedings of the 8th International Conference on Mathematics and Computers in Business and Economics*, Vancouver, Canada, 8, 226-232.

[16] Johnson, C. and Mazur, G. (2008). Value Based Product Development - Using QFD and AHP to Identify, Prioritize, and Align Key Customer Needs and Business Goals. *Proceedings of the 20th Symposium on QFD*, New Mexico, 23-39.
[17] Kano, N., Seraku, N., Takahashi, F. and Tsuji, S. (1984). Attractive quality and must-be quality. Hinshitsu: (*The Journal of the Japanese Society for Quality Control*), 14(2), 39-48.
[18] Kelesbayev, D., Kalykulov, K., Yermankulova, R., Dandayeva, B. and Aymurzayeva, A. (2015). Determination of Quality Requirements in Tourism Management and Finance Departments of Akhmet Yassawi University by Kano Model. *Mediterranean Journal of Social Sciences*, Vol. 6, No: 3 S1, 34-42.
[19] Kelesbayev, D., Kalykulov, K., Yertayev, Y., Turlybekova, A. and Kamalov, A. (2016). A Case Study for Using the Quality Function Deployment Method as a Quality Improvement Tool in the Universities. *International Review of Management and Marketing*, Vol. 6, No. 3, 569-576.
[20] Lai, X., Tan, K. and Xie, M. (2007). Optimizing Product Design Using Quantitative Quality Function Deployment: A Case Study. *Quality and Reliability Engineering*, 23(1), 45-57.
[21] Lai, X., Xie, M. and Tan, K. (2004). Optimizing Product Design Using the Kano's Model and QFD. *Proceedings of the International Engineering Management Conference*, Singapore, 3, 1085-1089.
[22] Li, Y., Tang, J., Luo, X. and Xu, J. (2009). An Integrated Method of Rough Set, Kano's Model and AHP for Rating Customer Requirements' Final Importance. *Journal of Expert Systems with Applications*, 36(3), 7045-7053.
[23] Lin, C., Chen, L. and Hsu, C. (2011). An Innovative Approach for RFID Product Functions Development. *Journal of Expert Systems with Applications,* 38(12), 15523-15533.
[24] Liu, M. (2013). "Assessing Student Dormitory Service Quality by Integrating Kano Elaborative Mode with QFD Method – A Case Study in a Hospitality College in Southern Taiwan". *Journal of Organizational Innovation*, 5/3, 133-150.
[25] Lofgren, M. and Witell, L. (2008). "Two decades of using Kano's Theory of attractive quality: A literature review". *Quality Management Journal*, 15/1, 59-75.
[26] Matzler, K. and Hinterhuber, H. (1998). How to Make Product Development Projects More Successful by Integrating Kano's Model of Customer Satisfaction into Qualify Function Deployment. *Technovation*, 18(1), 25-38.
[27] Mazur, G. (1997). Voice of the Customer Analysis: A Modern System of Front-End QFD Tools, with Case Studies. *Proceedings of the 6th Annual Quality Congress*, Orlando, FL, 1-9.
[28] Pouliot, Yannick (1992). Phylogenetic analysis of the cadherin superfamily. *BioEssays*, Vol. 14 No. 11. 743-748.
[29] Pourhasomi, M., Khamseh, A. and Hosseini, S. (2012). Integrating Kano's Model into QFD to Optimally Identify and Prioritize the Needs of Higher Education. *Interdisciplinary Journal of Contemporary Research*, 4(4), 233-246.
[30] Raharjo, H. (2007). Dealing with Kano Model Dynamics: Strengthening the Quality Function Deployment as a Design for Six Sigma Tool. *Journal of Technical Industry*, 9(1), 15-26.
[31] Raharjo, H., Brombacher, A., Gohc, T. and Bergmana, B. (2010). On Integrating Kano's Model Dynamics into QFD for Multiple Product Design. *Journal of Quality and Reliability Engineering International*, 26(4), 351-363.
[32] Seyedi, S., Shirazifar, M., Dalvand, M. and Zohdi, M. (2012). Optimal Examination and Prioritization of the Factors Affecting Customers' Satisfaction Using Integrated QFD and Kano's Model: Case Study of Shiraz's Refah Bank. *African Journal of Business Management*, 6(35), 9762-9772.
[33] Sireli, Y., Kauffmann, P. and Ozan, E. (2007). Integration of Kano's model into QFD for Multiple Product Design. *IEEE Transactions on Engineering Management*, 54(2), 380-390.
[34] Sofyalıoğlu, Ç. ve Tunail, İ. (2012). Kano Modelinin Kalite Fonksiyon Göçerimi Planlama Matrisinde Kullanımı. *Ege Akademik Bakış Dergisi*, 12(1), 127-137.
[35] Tan, K. and Shen, X. (2000). Integrating Kano's Model in the Planning Matrix of Quality Function Deployment. *Total Quality Management*, 11(8), 1141-1151.
[36] Tontini, G. (2003). Deployment Of Customer Needs In The QFD Using A Modified Kano Model. *Journal of Academy of Business and Economics*, 2(1), 103-115.
[37] Tontini, G. (2007). Integrating the Kano Model and QFD for Designing New Products. Total Quality Management & Business Excellence, 18(6), 599-612.
[38] Walden, D. (Ed.). (1993). "Kano's Methods for Understanding Customer-Defined Quality". *Center for Quality Management Journal*, 2/4, 3-35.
[39] Yadav, O. and Goel, P. (2008). Customer Satisfaction Driven Quality Improvement Target Planning for Product Development in Automotive Industry. *International Journal of Production Economics*, 113(2), 997-1011.
[40] Yeh, T. (2010). Determining Medical Service Improvement Priority by Integrating the Refined Kano Model, Quality Function Deployment and Fuzzy Integrals. *African Journal of Business Management*, 4(12), 2534-2545.

Lean Management Tools to Improve the Production System

Petr MIKHAILOVSKY[1], Andrey PLAKHIN[2], Ekaterina OGORODNIKOVA[3], Tatiana KOCHERGINA[4], Tatiana GUSEVA[5], Maria SELEZNEVA[6]

[1]Corresponding Author, Doctor of Economic Sciences, Professor, Management and Entrepreneurship Dpt., Ural State University of Economics, Ekaterinburg, Russian Federation; E-mail: unir-2019@mail.ru
[2]Candidate of Economic Sciences, Head of Management and Entrepreneurship Dpt., Ural State University of Economics, Ekaterinburg, Russian Federation, E-mail: apla@usue.ru
[3]Candidate of Economic Sciences, Associate Professor, Management and Entrepreneurship Dpt., Ural State University of Economics, Ekaterinburg, Russian Federation, E-mail: cmb_8@mai.ru
[4]Candidate of Economic Sciences, Associate Professor, Management and Entrepreneurship Dpt., Ural State University of Economics, Ekaterinburg, Russian Federation; E-mail: kochergina_tv@usue.ru
[5]Senior lecturer, Management and Entrepreneurship Dpt., Ural State University of Economics, Ekaterinburg, Russian Federation; E-mail: t.i.guseva@yandex.ru
[6]Senior lecturer, Management and Entrepreneurship Dpt., Ural State University of Economics, Ekaterinburg, Russian Federation; E-mail: mvselezneva@yandex.ru

Abstract

The efficiency of the production system determines the cost of production and the overall competitiveness of the enterprise. The development of the production system is the result of an integrated systemic approach to the organization of production; therefore, the efficiency of the production system is the rational use of all the resources of the enterprise. This article discusses the main tools of lean manufacturing and offers a step-by-step method for implementing the system using the example. Currently, only large Russian enterprises practice the introduction of lean production systems. In this article, we will look at how to implement the system on the example of a small group of company employees. This technique can be successfully applied in small enterprises. The aim of this work was to develop a concept for the development of a production system using lean management tools.

Keywords: *production system; efficiency; lean manufacturing; lean management tools; 5S.*

1. Introduction

In the current unstable economic situation caused by the imposition of sanctions, there is a worsening of conditions for business activities, in particular for the largest companies in the country. The unfavourable economic situation has created the need to find sources for improving efficiency and competitiveness in the context of a shortage of resources. In this situation, the development of the production system is the main way to improve the efficiency of domestic companies. Industrial organizations seek to improve the efficiency of the use of available funds, and also pay great attention to identifying domestic potentialities. Thus, the development of the production system is the most optimal and least costly tool for increasing efficiency. In order to study the applicability of the principles of work of industrial systems of industrial organizations consider the relevant theoretical foundations and possible improvement tools.

Different authors note that the production system includes a set of heterogeneous elements, the functioning of which leads to the achievement of the main goal – the sale of finished products / services (Wader, 2005, Carlino, 2003). It should be noted that in a market economy, an important factor in the functioning of the production system is the production-marketing system of relations between an enterprise and a supplier, an enterprise with consumers of finished products. Integration of the enterprise's production system with the external environment requires a rational organization of internal processes, including transport and warehousing systems (Mac Duffie, 1997). Achieving the main goal of the production system is possible through the management of its operation and development. We can say that the production system is a means of realizing the interests of consumers. The approach to the development of the production system, which consists in the continuous improvement of the enterprise as a production and sales system, is reflected in the concept of lean production of Toyota (Sony, 2018).

2. Theoretical approaches to research

The structure of the production system in a modern competitive market is determined by the quality of the product, competitive price, production flexibility, speed of the production cycle, which is the key to improving overall efficiency. The effectiveness of the industrial enterprise's production system is determined by the ability to manufacture products or provide services with minimal losses, to identify and eliminate losses, and to train personnel. Thus, the cost of production and the competitiveness of the enterprise depend on the efficiency of the production system.

The production system is characterized by the rationality of the use of all resources of the enterprise (raw materials, capital, labor, etc.), taking into account the production specifics of the enterprise. The production system includes all stages of production and sales activities (Leyh, 2018).

The structure and directions of development of the production system are independently determined by the company at a strategic level. In our opinion, the elements of the production system are personnel, equipment, quality, costs, the active element of which is a person, as well as financial solvency. The growth potential of the company is determined by operational efficiency. Improving operational efficiency is achieved through staff development. However, the development of the production system is the result of an integrated system approach to the organization of production, therefore, the efficiency of the

production system is the rational use of all the resources of the enterprise (Panwar, 2018, Singh 2018).

The concept of lean manufacturing contains principles, methods and tools for organizing production and labor in industrial enterprises that differ from traditional approaches. Lean manufacturing allows to produce large volumes of products and services with less effort, on smaller production areas and at lower costs. In essence, lean manufacturing tools are a set of methods or methods of practical application of the proposed system. Such tools include, in particular, the 5S workplace organization system, Just in Time, kanban, kaizen blitz, quick changeovers (SMED), error prevention, creation of a value stream map (Value Stream Mapping), universal equipment maintenance (TPM – Total Productive Maintenance), visualization, One-touch setup, U-shaped cells, etc. (Gálová, 2018, Boyer, 1996, Besterfield, 2003, Van Der Steen 2018). One of the core values of lean manufacturing is the subjective feeling of the consumer that the products he needs will be delivered at the right time and place.

The need to develop and implement projects in the field of "lean production" is associated with the need to ensure the high competitiveness of a modern enterprise, and to increase global competition in traditional sales markets. To this end, it makes sense to turn to world experience in the field of lean manufacturing. It is thanks to the consistent implementation of the ideas of Deming, Juran and Kaori Ishikawa and other gurus that Japan, a country more than poor in natural resources and devastated by war, became one of the richest countries in the world.

Edward Deming, one of the leading experts in statistical methods of quality assurance, in 1950 received an invitation from the Japanese Union of Scientists and Engineers to take part in the program of restoring Japanese industry. There, Deming proposed a quality management program, developed the principle of continuous quality improvement, which revolutionized Japanese industry (Deming, 1986). Crosby in 1964 offered the program "Zero defects" (Crosby, 1984). Feigenbaum developed the principles of total quality management and parallel (simultaneous) engineering. Ishikawa came up with a “quality circle”, proposed a “cause-and-effect” diagram (Ishikawa diagram), developed a quality management concept in which the entire enterprise team participates. Juran developed the principle of "quality triads". Messing proposed the “quality manual” as the main document of the enterprise quality assurance system.

In terms of the practical implementation of “lean production”, the issues of assessing the actual state and the long-term prospects for using the “lean manufacturing” instruments acquire particular significance. Because, firstly, there may be an illusion that a lot has already been done at the enterprise and you can reduce the activity of introducing tools and methods of lean production, and secondly, each next step to reduce losses and increase enterprise efficiency will require more significant efforts. In this regard, there is a need to develop a model that would demonstrate further reserves for the implementation of tools and methods of "lean manufacturing".

The 5S system is a set of measures for the rational organization of workplaces, ensuring job safety, productivity growth, improving product quality, and improving the culture of production. The system got its name from the first letters of five Japanese words: seiri (整理), seiton (整頓), seisō (清掃), seiketsu (清潔), and shitsuke (躾). These have been translated as "Sort", "Set In order", "Shine", "Standardize" and "Sustain" (figure 1). The list describes how to organize a work space for efficiency and effectiveness by identifying and storing the items used, maintaining the area and items, and sustaining the new order. The decision-making process usually comes from a dialogue about standardization, which builds understanding among employees of how they should do the work.

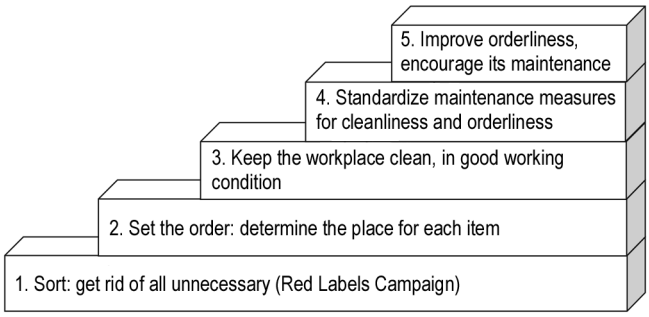


Figure 1. Ladder to create an effective workplace

The system establishes five steps, the implementation of which is aimed at creating optimal conditions for carrying out operations, maintaining order, cleanliness, accuracy, saving time and energy to increase productivity, prevent accidents, and reduce environmental pollution.

The 5S system helps to quickly get rid of the accumulated in the production of trash and eliminate its appearance in the future. The principles on which the 5S system is based are shown in Table 1.

The use of the 5S system allows to create effective workplaces, which contributes to cost savings, improving quality, increasing production efficiency, productivity and safety.

Principle	The content of the work
1. Sort: get rid of all unnecessary	All items are divided into three categories: unnecessary, not needed urgently and necessary. Unnecessary ones are deleted. Not needed urgently located at a certain distance from the workplace or stored centrally. The necessary ones are stored in the workplace.
2. Set the order: determine the place for each item.	In relation to the necessary objects and objects not urgently needed, solutions are developed and implemented that ensure: speed, ease and safety of access to them; visualization of the storage method and control of the presence, absence or location of the desired item; freedom of movement of objects and aesthetics of the production environment.
3. Keep the workplace clean	General cleaning of the premises (if necessary). Thorough sweeping and cleaning equipment, fixing and troubleshooting. Identification of sources of pollution, hard-to-reach and problem areas. Development and implementation of measures to clean hard-to-reach places, eliminate sources of problems and pollution. Elaboration of rules for cleaning, equipment cleaning, lubrication, inspections.
4. Standardize cleanliness and cleanliness.	Fixing in writing the rules: removal of unnecessary, rational placement of objects, cleaning, lubrication, inspections. Maximum visualization of the presentation of the rules (drawings, diagrams, icons, pointers, color coding). Visualization of the control of the normal state and deviations (in the equipment, stock levels, etc.). Standardization and unification of all symbols (size, color, symbol image, etc.). Rationalization of information carriers (material, method of inscription, protective coatings), their placement and attachment points.
5. Improve order, encourage its maintenance.	Fixing the areas of responsibility for each employee (the objects of attention and the main responsibilities for maintaining them in good condition). Developing the right habits of the staff, consolidating the skills of compliance with the rules. The use of effective methods of control.

Table 1. Disclosure of 5S Basic Principles

3. Results of the study

Among the Russian enterprises, the first to begin to introduce lean production, mainly large industrial companies. In this textbook, KAMAZ, GAZ Group, VSMPO-AVISMA, Rusal, Evraz Holding, Eurochem and a number of others. Unfortunately, the most common reason for starting work with consultants are problems experienced by entrepreneurs. It should be noted that the main reason for the introduction of a lean manufacturing system is the growth of manufacturing defects. But at the same time, having received the first effect, they do not stop at what they have achieved, understanding that only constantly following

the principles of the new system will lead to maximum return.

Table 2 shows the results of the efficiency evaluation of implementation the lean production systems on the example of enterprises of the Sverdlovsk region, presented by 10 experts.

As the analysis shows, there are high marks on such criteria as "Declaration and principles of lean production", "Employee training", "Availability 5s", "Availability and quality of kaizen offers". At the same time, at a sufficiently low level, experts estimate the level of implementation of such lean manufacturing tools as "Studying customer requirements", "Assessing customer satisfaction", "Using a draw system", "Working with suppliers and dealers on lean production technologies". It should be noted that the average values obtained are generally correlated with indicators for large enterprises.

In general, it can be noted that the degree of implementation of lean manufacturing technologies is at a relatively average level. However, in terms of the “Personnel” subsystem, there are higher grades, rather than the “Strategic Management” and “Processes” subsystems.

An expert assessment of the effectiveness of the implementation of individual parameters of the “Lean Production” system at Sverdlovsk region is presented in Figure 2.

Estimated indicators		Expert estimates										Av.
		1	2	3	4	5	6	7	8	9	10	
Subsystem "Strategic Management"	Availability of strategic management	3,5	5,1	3,0	3,9	5,2	3,0	4,0	3,6	4,4	6,9	4,26
	Lean manufacturing philosophy	5,5	5,3	5,3	5,0	5,7	5,7	5,0	6,0	6,0	5,0	5,45
	Declaration and Principles of Lean Production	8,1	7,1	8,4	8,5	7,3	7,9	6,8	7,8	9,0	8,1	7,90
	Involvement of senior management, the implementation of personal projects	5,8	6,5	5,8	5,3	7,0	5,5	6,9	6,6	6,6	6,5	6,25
	KPI - key performance indicators	4,6	4,5	4,4	3,2	4,5	3,2	3,9	3,4	3,8	4,8	4,03
	Consumer requirements study	3,7	3,1	3,1	2,0	2,4	2,9	3,3	3,8	3,0	2,8	3,01
	Customer Satisfaction Assessment	2,0	5,0	2,9	4,3	2,2	4,1	2,4	2,3	2,4	2,7	3,03
average												4,85
Subsystem "Personnel"	Employee training	6,2	6,8	7,8	6,5	7,8	8,0	7,5	6,8	6,0	7,5	7,09
	Employee cohesion	2,5	4,5	4,5	4,1	2,3	2,7	1,7	2,8	2,3	4,2	3,16
	Availability and quality of kaizen offers	7,9	7,4	7,8	8,2	8,0	7,9	7,6	7,6	7,5	8,9	7,88
	Educating leaders who practice lean manufacturing	5,8	4,3	4,1	4,2	4,0	6,0	6,0	4,6	4,6	5,3	4,89
	Creating a self-learning organization	5,0	3,6	4,6	4,6	3,5	3,2	4,9	3,8	4,9	4,1	4,22
average												5,45
Subsystem "Processes"	5S availability	6,8	6,4	6,1	5,8	6,9	5,4	6,7	4,7	5,8	7,0	6,16
	Using a pull system	3,3	4,4	3,6	4,2	2,7	4,4	2,7	3,4	4,3	3,5	3,65
	Uniform distribution of work	4,0	6,9	3,5	3,2	5,7	6,2	4,5	4,7	3,4	6,8	4,89
	Use of visual control	6,8	3,1	6,5	5,2	6,6	4,2	6,5	3,8	5,2	5,4	5,33
	Loss reduction	6,4	3,7	6,1	5,5	5,5	4,2	3,1	5,0	5,5	3,6	4,86
	Improving product quality	3,0	5,3	5,9	4,8	5,5	4,2	4,7	3,3	6,2	4,3	4,72
	Improving the quality of service	4,2	5,6	6,6	5,5	3,9	6,5	6,2	5,7	7,0	6,9	5,81
	Work with suppliers on lean manufacturing technology	4,3	3,2	4,5	4,2	3,7	5,7	5,6	3,4	4,8	3,9	4,33
	Work with dealers on lean manufacturing technology	5,5	3,9	3,3	5,1	3,2	4,9	5,2	4,9	3,3	4,5	4,38
average												4,90

Table 2. Efficiency evaluation of the implementation Lean Production system

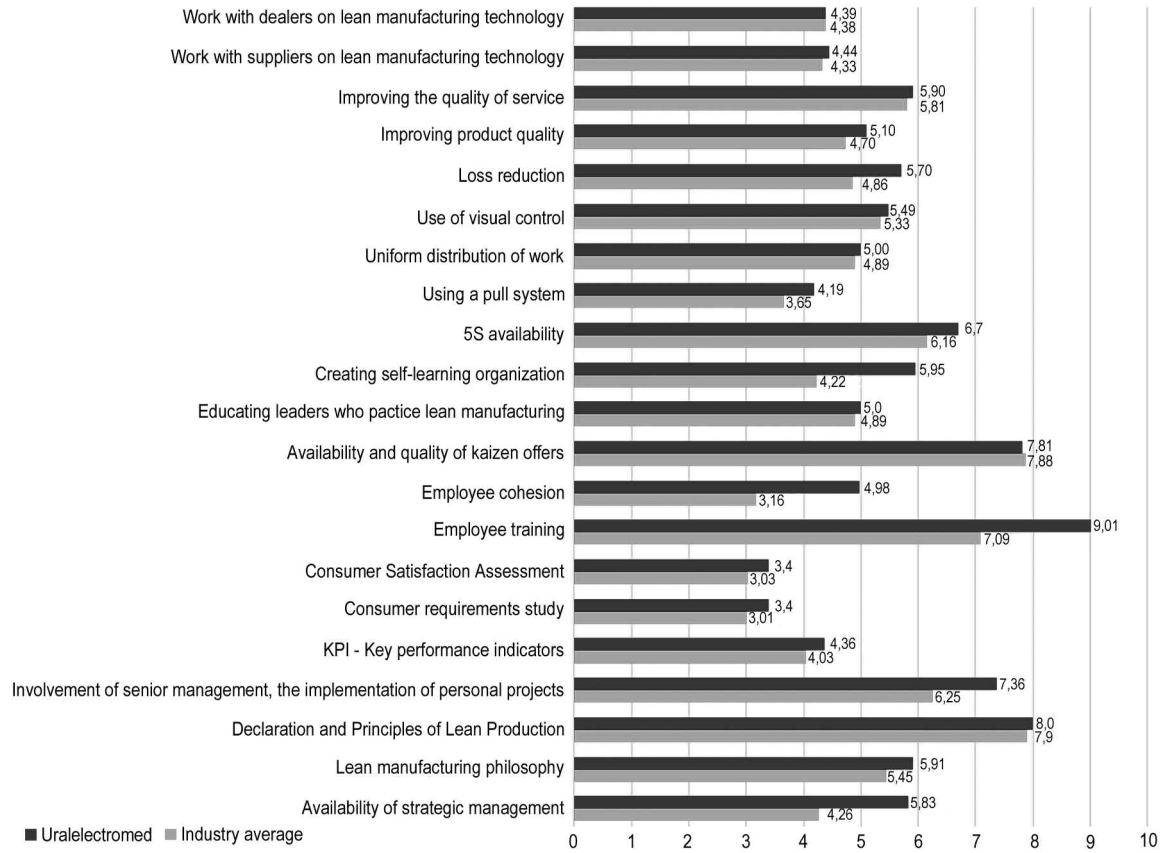


Figure 2. Monitoring implementation effectiveness of the lean production systems

To further improve the management efficiency of the implementation of a lean manufacturing system, competent use of all tools is necessary.

Lean manufacturing tools are simple techniques that allow you to see opportunities for improvements, significantly reduce losses, constantly improve the entire range of business processes, increase the transparency and manageability of an organization, use the potential of each employee of the company, increase competitiveness, and achieve significant economic benefits without large financial costs.

4. Conclusion

The authors recommend the company to introduce the program “Preparing Masters of Lean Manufacturing”, which will allow creating a new level of managers in production – both from newly hired employees and from those already working.

It is necessary to introduce a methodology for the selection of candidates for participation in this program. It should also more actively apply the method of 5S and KPI. Applying the 5S methodology – a rational organization, evaluating the workplace, will significantly increase the efficiency and controllability of the operating area, improve organizational culture, help improve employee productivity, reduce the number of defects, and ultimately save time and money for the enterprise. This system will also allow the entire staff of the enterprise to engage in regular activities to restore order, cleanliness and assessment of discipline in the workplace.

References

[1] Besterfield D H, Minhna C. B., Besterfield B. H. and Sacre M. B. (2003). *Total Quality Management*, 3rd Edition, Prentice Hall: New Jersey.

[2] Boyer K. K. (1996). An assessment of managerial commitment to lean production. *International Journal of Operations and Production Management.* 16 (9) pp 48-59.

[3] Carlino A. (2003). Improving Quality through Waste Elimination. Available at: http://www.findarticles.com/p/articles/mi_qa3618/is_200309/ai_n9253653.

[4] Crosby P. B. (1984). *Quality without Tears: The Art of Hassle-free Management.* New York City: McGraw-Hill pp. 77.

[5] Deming W. E. (1986). *Out of the crisis: quality, productivity and competitive position.* Cambridge, Cambridge University Press.

[6] Gálová K., Rajnoha R. and Ondra P. (2018). The use of industrial lean management methods in the economics practice: An empirical study of the production companies in the Czech Republic. *Polish Journal of Management Studies.* 17 (1) pp 93-104.

[7] Leyh C., Martin S. and Schäffer T. (2018). Analyzing industry 4.0 models with focus on lean production aspects. *Lecture Notes in Business Information Processing.* 311, pp 114-130.

[8] Mac Duffie J. P. (1997). The road to “root cause”: shop-floor problem-solving at three auto assembly plants. *Management Science*. 479-502 43 (4) pp 210-215.

[9] Panwar A., Jain R., Rathore A. P. S., Nepal B and Lyons A. C. (2018). The impact of lean practices on operational performance – an empirical investigation of Indian process industries. *Production Planning and Control*. 29 (2) pp 158-169.

[10] Singh J., Singh H., Singh G. (2018). Productivity improvement using lean manufacturing in manufacturing industry of Northern India: A case study. *International Journal of Productivity and Performance Management*. 67 (8) pp 1394-1415.

[11] Sony M (2018). Industry 4.0 and lean management: a proposed integration model and research propositions. *Production and Manufacturing Research*. 6 (1) pp. 416-432.

[12] Van Der Steen M. P., Tillema S. (2018). Controlling lean manufacturing in multidivisional organisations: Highlighting local interests and constraints. *International Journal of Operations and Production Management*. 38 (11) pp 2149-2168.

[13] Wader M (2005). *Lean Tools: A pocket Guide to Implementing Lean Practices, Productivity & Quality*. Publishing Private limited: Madras.

Quality Management System as a Non-Financial Indicator in Tourism Enterprises

Tünde Dzurov VARGOVÁ [1], Peter GALLO Jr. [2], Daniela MATUŠÍKOVÁ [3], Milena ŠVEDOVÁ [4], Jaroslava GBUROVÁ [5]

[1] Corresponding author, University of Prešov in Prešov, Faculty of Management, Department of Tourism and Hotel Management, Konštantínova 16, Prešov, Slovakia; E-mail: tunde.dzurov.vargova@smail.unipo.sk
[2] University of Prešov in Prešov, Faculty of Management, Department of Management, Konštantínova 16, Prešov, Slovakia; E-mail: peter.gallo1@unipo.sk
[3] University of Prešov in Prešov, Faculty of Management, Department of Tourism and Hotel Management, Konštantínova 16, Prešov, Slovakia; E-mail: daniela.matusikova@unipo.sk
[4] University of Prešov in Prešov, Faculty of Management, Department of Tourism and Hotel Management, Konštantínova 16, Prešov, Slovakia; E-mail: milena.svedova@unipo.sk
[5] University of Prešov in Prešov, Faculty of Management, Department of Marketing and International Trade, Konštantínova 16, Prešov, Slovakia; E-mail: jaroslava.gburova@unipo.sk

Abstract

For the development of tourism, the strategic objective is to increase competitiveness in order to make better use of existing potential. One of the possibilities of achieving this goal is quality, connected with the provision of services for tourists. The article is focused on quality management system as a non-financial indicator in tourism enterprises in Slovakia. The main goal is to find out what is the current state of use of the quality management system in tourism enterprises in the country. Using questionnaire method, it brings the overview of the current situation on the example of chosen enterprises in tourism sphere. Survey results bring knowledge that more than 10% of enterprises operating in tourism sphere in Slovakia already use quality management systems to improve their quality. The other finding confirms that Total Quality Management method is used by enterprises that are represented by a higher quality level, which is given by the number of stars.

Keywords: *quality management system; total quality management; tourism; tourism establishments; services; visitor.*

1. Introduction

Recently, there has been growing interest in developing strategic management in order to adapt to the economic instability and uncertainty of societies (Popescu, Andreica, Popescu, 2018). Quality has become one of the most important factors in international competition for economic success.

Because of the increased pressures on changing markets, dynamic technology and global competition, companies are increasingly confronted with the need to transform strategic levels (Ceptureanu, Ceptureanu, Popescu, Vlad, 2017). This is particularly true for the broad tourism sector, where the number of "new" tourist destinations is constantly increasing, traders and operational managers invest in a higher quality of service than a competitive strategy to differentiate their offer.

For the development of tourism, the quality of products and services provided by businesses is inevitable (Dzurov Vargová, Gallo, Šenková, Šambronská, 2018). Unfortunately, the quality of services provided in a given area is very variable in Slovakia. Along with the lack of innovation, this is one of the barriers to the competitiveness of international tourism (Gúčik, Gajdošík, Lencsésová, 2016). The tourism product is mainly influenced by the intangible aspect of services, namely satisfaction and individual perception of quality by visitors in tourism. It is therefore necessary for business entities to actively detect the satisfaction of their visitors, analyse their needs and adjust the final product to the customer's “image” based on the information found (Balogová, Lovasová, Lukáčová 2018). One of the tools through which we can continually improve the quality of supply-side products and services is the introduction of a comprehensive Quality Management for Services (TQM) that helps to develop more efficient use of in-house processes and develop employee skills and awareness. Quality is a key element of the current corporate development strategy under the current globalization conditions. Elements of a well-functioning TQM guarantee production with high quality parameters, which is also part of the company's continuous development (Borkowski, Stasiak – Betlejewska, 2016). The quality management philosophy emphasizes the importance of continually improving and ensuring service values in relation to both customer and employee designs.

2. Theoretical basis

Tourism is an important sustainable industry in the economy that optimizes the industrial structure. It enables to travel and gain new experiences, travel without barriers, escape from everyday stereotypes and independently implement and disseminate knowledge (Šambronská, Matušíková, Gallo, Šenková, Mitríková, 2016). Tourism is a special type of product that Witt and Mountinho (1994) analysed into two dimensions. First, the overall tourism product as a combination of all the service elements that visitor consume from the moment they

leave the house until they return. According to these authors, the total tourism product consists of five main components; target attractions, target devices, accessibility, image and prices. They defined the second dimension in commercial products that are part of the overall tourism product, such as accommodation, transport, attractions, etc. According to Cooper, Fletcher, Fyall, Gilbert and Wanhill (1993), tourism means temporary movement to destinations outside the normal home and workplace, such as activities performed during the stay and facilities designed to meet the needs of tourists. They claim that tourism brings significant economic and social benefits to countries, communities and individuals. On a global scale, the growth rate of tourism is phenomenal, as global international tourist arrivals have risen from 25 million in 1950 to 1.4 billion by 2018. Up to Drossos and Tsotsolas (2014), tourism is composed of activities, services and industries that bring experience in the field of travel: transport, accommodation, catering shops, entertainment, activities for individuals or groups leaving home and includes all service from providers to visitors. Bačík, Múdrik and Štefko (2016) stress the need to monitor constantly changing trends in travel. They point out that the tourism preferences of the current generation are significantly different from those from the past. In the context of modern organizations, it is common practice to place increasing emphasis on customer opinion, service quality issues, and the resulting satisfaction. In order to increase the quality of services provided to people, it is necessary to introduce an effective system that ensures customer requirements. The quality of tourism services and products can be greatly improved if a tourism facility implements quality management systems in its organization. Such step effectively helps to improve the offered services and products, but does not guarantee their impact on the performance of the organization (Onuferová, Čabinová, 2018). There are few sectors in the economy in which companies can maintain their long-term position without devising development and innovation (Gallo, Píchová, Šenková, Matušíková, Mitríková, 2017). Canalejo and Del Rio (2017) highlighted the importance of the expected and perceived quality as well as the satisfaction and loyalty among visitors, so that tourism managers can set goals for improvement and competitiveness. Measuring service quality and customer satisfaction can help service providers support their long-term market prospects by identifying areas that need improvement and, last but not least, establish appropriate procedures to improve the quality of tourism and adapt it to the needs of travellers according to their motivation to travel. Tourism businesses play a key role in the efficient functioning of tourism (Bing et al. 2018). In an ever-changing competitive environment, tourism businesses are forced to provide quality services and maintain excellence. Quality must be customer-oriented, based on its needs (Babinský, Bujna 2015). We agree with the authors as the competition of business in a modern organization is intensifying and therefore tourism enterprises need not only to increase their market share, but mainly to improve the quality of services provided, and also to improve the performance of their employees. The provision of tourism services and the management of their quality are based on quality systems based on established techniques, traditions and information, but are also regularly refined based on their experience of use. These systems are regularly updated based on new trends in tourism and customer-targeting requirements, which are crucial in deciding which of the tourism market operators to choose. We believe that if Slovakia is to become a world-class destination capable of assessing wealth and diversity of supply, it is necessary to innovate in tourism, which is also to introduce a quality management system. In our opinion, the tourism system positively affects the needs and requirements of customers, as well as the goals and strategic - business objectives of tourism service providers. In tourism, there are a number of different concepts and approaches to quality, defined according to the basic principle, form (brand / price), focus (universal / specialized), voluntary (voluntary / obligatory), scope (international, national, regional, local, corporate)), the number of actors involved, etc. (Indrová, Houška, Petrů, 2011). The common feature of all concepts is the gradual increase in quality within each level, which offers the opportunity to move from the simplest to the most complex ones. We consider Casadesú and Heras division (2006) to be the most comprehensive one of quality systems, dividing quality systems into three groups:

1. *Quality Tools* – these are aids in applying quality that are documented (not oral agreements);
2. *Quality Assurance System* – this is a system designed to provide confidence that quality requirements will be met. The established system is confirmed by a brand that becomes a part of corporate identity and a "guideline" for tourism visitors. In practice, these are, for example, ISO 9000 quality systems norms;
3. *Quality Improvement System* – it is oriented to improving the ability to meet quality requirements. It is evaluated by the price given by the jury after professional consideration and compliance with the standards. As an example is a complex quality management.

According to Gučík, Gajdošík and Lencsésová (2016), three concepts of quality systems are introduced in tourism, namely the concept of equipment and service standards, the quality concept according to ISO standards 9000 and the concept (TQM). The essence of equipment standards and services is the determination of requirements for a product or service, the definition of a target requirement and, at the same time, an indicator for the measured fulfilment of quality requirements (Gučík, Gajdošík, Lencsésová, 2016). Requirements can be defined for the layout and equipment of individual areas of the tourism facility, additional services, work processes, product and service quality, way of communication with the guest, information system, terminology, management system, hygiene conditions, fire protection measures, environmental requirements, safety of movement guests and employees, traffic and parking conditions, etc. (Sládek 2003, Šípková 2004). The role of equipment standards and services is to protect the consumer, to guide entrepreneurs in tourism, to clarify the offer, what claim they have to answer, what to include, when and where it is provided. Standards may exist in the form of classification, categorization, certification schemes, laws, ordinances, technical standards, internal regulations and standards, methodological guidelines, and a quality mark shall be given for their fulfilment (see more Gučík, Gajdošík, Lencsésová, 2016). We are of the opinion that their implementation takes place at the international, national, regional, local and corporate levels, and the recent trend is mainly to unify standards, especially by the European Union, and specialize in selected target groups of customers (environmentally conscious, disabled), families with children, athletes, etc.) or specific tourism products (cultural routes, wellness services).

Quality in services and hence in tourism services, unlike conventional production, is specific, which is due to the nature of the services that predetermines the way of managing and influencing the quality of tourism services.According to authors

Service Elements in Demand (customer)	Features of service delivery processes in terms of supply (organization)
Service reliability	Technical equipment
Sensitivity Access to Customers	Employees
Employee qualifications	Working procedures for service delivery
Empathy for the customer's individual wishes	Marketing
Impact of the environment on the customer	Providing information to customers

Table 1. Elements of quality of services in tourism
Source: Gúčik, Gajdošík, Lencsésová, 2016

Gúčik, Gajdošík and Lencsésová (2016), TQM is an important philosophy in the quality management system, which should be manifested in all activities of the organization, its departments

and employees. TQM perceives the organization not only as a technical but also as a social system. TQM is a challenging concept of quality management, which is usually tied to organizations after gaining experience in applying ISO standards.

Based on the Service Quality Analysis document for selected tourism sectors (Ministry of Transport and Construction of the Slovak Republic 2015), the customer generally perceives the quality of services at two levels:

(a) the technical quality level at which the customer assesses the quality of the product he receives as part of the service (quality and equipment of the ski area, the quality of the food in the restaurant – all the products and ingredients contained, the level of amenities of the accommodation, etc.);
(b) the functional (process) level of quality where the customer assesses the manner in which the service was provided to him (behaviour and attitude of staff, ability to remedy deficiencies, credibility of the service provider, etc.).

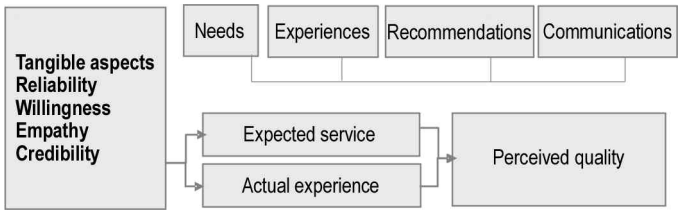


Figure 1. Quality of service perceived by Customer
Source: Service quality analysis for selected tourism sectors 2015

The quality management systems of the provided services are implemented in countries where tourism is one of the main revenues of the state budget. Among the countries that use such or similar types of systems are e.g. Germany, Switzerland, Spain, France, Austria, United Kingdom of Great Britain and Northern Ireland. These systems have emerged either from the bottom of the private sector initiative, or from the initiative of individual governments, but always with a view to contributing to improving the quality of tourism services provided. Their spontaneous development respecting the needs of individual countries brought some methodological differences. The dominant direction that is developing in Europe is systems that are based on a process approach. Hence, access to quality in tourism must be based on respect for the fundamental principles of modern management systems. As a result, the company will be able to deliver quality services to the customer's expectations, and thanks to efficient organization management based on a well-defined vision of the organization, enterprise standards and efficient communication, the organization can save part of its costs. Also in the application of TQM, the process approach, where the quality of the individual processes is of overall quality, has a significant impact.

Quality of service is one of the main assumptions of a healthy economy for every developed country. The population can present its country and its uniqueness through tourism, which will ensure the visibility and presentation of the country in the world. We can say that quality services in tourism have a positive impact on the presentation of the country. Therefore, due attention should be paid to this issue. In Slovakia, the quality of services is characterized by a relatively large regional disparity. The lower competitiveness of tourism operators is often caused by a lack of quality management. We often encounter significant problems with the quality of equipment services that are in the same category. The lack of competitiveness of tourism operators is due to some extent to the lack of quality management, and the introduction of quality management systems could eliminate these shortcomings. Tourism service providers in Slovakia are currently focusing mainly on the number of clients and the company's economic results while forgetting to closely monitor and measure customer satisfaction. There is a lack of detailed and well-established methods and systems for tracking and managing risks and opportunities in service delivery. Most tourism destinations do not have a service-related hazard management system in place and do not have a dedicated system to manage them while risk-taking is the greatest risk in tourism business. One of the main criteria for doing business in tourism should be customer satisfaction. Based on statistical results, increased numbers of dissatisfied clients are reported. Destinations operating in tourism should be aware of the external impacts that are relevant to their purpose and strategic direction and affect their ability to achieve the intended (planned, expected) result of their own established quality management system. It is natural that the fundamental principles of advanced quality management systems include the principle of continuous improvement and innovation, which should be a real driving force for their sustained development in each organization (Gallo, Píchová, Šenková, Matušíková, Mitríková, 2017). Finally, it should be noted that thanks to Casadesús and Heras (2006), it is clear that standardization of quality management systems in the tourism sector will continue to increase over the coming years due to both external and internal factors.

3. Data and methodology

The presented article is focused on the use of the TQM method in tourism enterprises in Slovakia. The main goal of the research, which we defined as finding out the use of TQM in tourism enterprises, was also supported by partial goals by which we tried to verify the dependencies between the use of TQM and the level of the hotel establishment, which is given by the number of stars.

As a proper method for obtaining data, we chose the questionnaire survey method. The questionnaire was created online through google form application. The questions in the questionnaire represented a combination of questions with the possibility of selecting a specific answer and questions created by the Likert scale. We consider the Likert scale to be an appropriate tool to determine the importance of individual factors relating to our research. The choice was made up of a five-point scale and the respondent could choose which point was best and answer the question. The questionnaire consisted of two logically related parts. The first part focused on identification issues related to the size of the business, the level of the business in tourism represented by the number of stars and the like. The second part of the questionnaire focused on the research part in which the questions were directed specifically to the TQM.

The category of enterprises operating in tourism was based on the methodology and classification of enterprises OKEČ and SK NACE. SK NACE is the standard classification of economic activities used in the European Union. The database of tourism companies, which we used for the purposes of our research, was obtained from the Slovak Business Agency. We sent the questionnaire to 580 enterprises in Slovakia. Of all the questionnaires sent, 57 were returned, so the questionnaire return was 9.83%.

The questionnaire was created based on the hypotheses that were based on the main goal of the paper:

H1: We assume that more than 10% of hotel facilities use Total Quality Management to conduct their business.

H2: We assume that there is a statistically significant relationship between the number of stars represented by the hotel and the use of Total Quality Management method.

To verify the hypotheses, we used the method of proportion of the phenomenon in the population and the Chi-square method of independence. We tested the hypothesis using the Chi-square test in the Statistica statistical program StatSoft software version 9.9.

Descriptive statistics methods such as analysis, synthesis, induction and deduction as well as pivot tables were also used to evaluate the questionnaire.

Table 2.
Used statistical methods

Source: Marcheová, Tirpáková, Stehlíková (2011)

Indicator	*Formula*	*Explanatory note*
Pearson's Chi-square Test of Independence	$\chi^2 = \sum \frac{(f_e - f_t)^2}{f_t}$	χ^2 – the Chi-square value subsequently compared to a table value based on the selected error probability, f_e – the empirical frequency of observed variables, f_t – the theoretical frequency of observed variables.
Method of Proportion of the Phenomena in the Population	$p = \hat{p} \pm z_\alpha * \sqrt{\frac{\hat{p} * \hat{q}}{n}}$	$\hat{p}$ - Proportion of the given phenomenon in the selected sample q - The proportion of the opposite phenomenon in the selected sample n - Size of selection z_α - Reliability rate

4. Results and discussion

The research we conducted was focused on using the TQM management method in hotel facilities in Slovakia.

We used the data obtained from the questionnaire to find out the current state of use of the mentioned method in tourism enterprises. The questionnaire contained a specific question on using this method to manage a business. When verifying the conceptual hypothesis, we used a statistical method to determine the proportion of the phenomenon in the population. The results are shown in Table 3.

Method of Proportion of the Phenomena in the Population	
$\hat{p} = 0.2166$ $\hat{q} = 0.7333$	$p = 0.2166 \pm 1.96 * \sqrt{\frac{0.2166 * 0.7333}{57}}$ $p = 0.2166 \mp 0.0514$ $0.1158 \leq p \leq 0.3175$

Table 3. Results of Testing the First Hypothesis using the Proportion of the Phenomena in the Population
Source: own processing

By verifying the hypothesis through the method of proportion of the phenomenon in the population, we reached values from 11.58% to 31.75% (see Figure 2). These values were obtained by calculation, where we substituted the following variables. The first variable contained the percentage of hotels that use the TQM management method. The second variable was determined based on the opposite phenomenon, namely the percentage of enterprises that do not use the TQM management method. To obtain a relevant result, we set a 95% confidence level, which is rated by 1.96 coefficients.

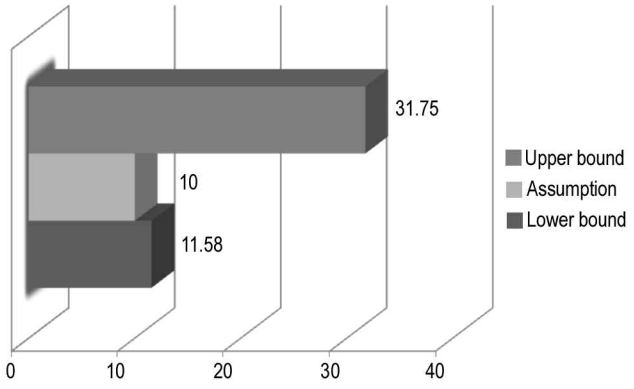


Figure 2. Comparison of the assumption with Use of Total Quality Management
Source: own processing

In verifying the hypothesis using the above-mentioned method, we have reached values above expected 10%. This means that Total Quality Management method uses more than 10% of hotel facilities in Slovakia. Based on the hypothesis, we can conclude that the hypothesis was confirmed, so we accept this hypothesis.

In verifying the second hypothesis, we have assumed the assumption that Total Quality Management method is used by enterprises that are represented by a higher quality level, which is given by the number of stars. Thus, we have assumed that there is a statistically significant relationship between the use of TQM and the level of hotel establishment represented by the number of stars. We also used Pearson's Chi-square test of independence to verify this hypothesis. The result of this test is described in Table 4, where, as in the previous hypothesis, it contains the expected frequency of business ownership dependencies.

Pearson's Chi-square Test of Independence	
Calculated value	$p = 0.0467$
Error profitability	$\alpha = 5\%$ (0.05)
Degree of freedom	DF = 1.00
Critical value	$\chi^2 = 0.01$

Table 4. The results of testing hypothesis using the Pearson's Chi-square Test of Independence
Source: own processing

Figure 3 graphically illustrates the direct relationship of these two variables by XY scatterplot.

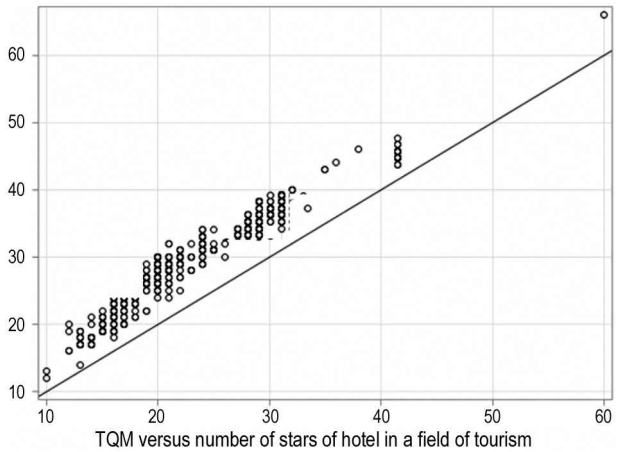


Figure 3. Scatterplot of hotel's number of stars and use of TQM
Source: own processing

By verifying the hypothesis using the Chi-square test, we can state that there is a statistically significant relationship between the hotel level represented by the number of stars and the use of Total Quality Management in the hotel facilities in Slovakia. The calculated p value is less than 0.05. It follows that there is a statistically significant relationship between the variables and we accept the hypothesis.

5. Conclusion

Many studies show the positive impact of implementing a quality management system on business performance, while others show no impact. Slovakia dominates by small and medium-sized enterprises, whose effort to offer quality services and products are increasing. Based on our questionnaire research we found out that the use of the quality management system in addressed hotel facilities and overall in tourism

business in Slovakia, the use of TQM still at very low level.

The purpose of our research was to find out the situation in using the TQM management method in hotel facilities in Slovakia and to determine the dependence between its use and the hotel level represented by the number of stars. The results of the research show that the use of the TQM method is still at a very low level in the addressed hotel establishments and overall tourism enterprises in Slovakia, where approximately 11% of companies actually use the concept. We also found that the use of the concept depends on the level of the hotel according to the number of stars in the use of TQM.

Based on our own experience, we must agree with the opinion that the implementation of a quality management system in tourism will not guarantee an increase in the revenue of the organization, but in many cases, it is mainly about customer satisfaction, improved sales planning and product implementation. Quality is also reflected in increasing efficiency and economy in company. After the implementation of the quality management system, it is also possible to illustrate the improvement of the customer care situation as well as the improvement of the corporate culture.

Acknowledgement

This article is outputs of grant to support the research activities of PhD students and young researchers at the University of Prešov in Prešov by the Rector of the University for the Project No. GaPU 38/2019.

References

[1] Babinský, M., Bujna, M. (2015). *Znaky kvality pre zariadenia turizmu a agroturizmu*. Dudince: EZAT.

[2] Bačík, R., Múdrik, M., Štefko, R. (2016). Analysis of tourism travel trends after 2014. In *Journal of Environmental Management and Tourism*. Vol. 7, No 1, pp. 88-93.

[3] Balogová, B., Lovašová, S., Lukáčová, V. (2018). Social loneliness and social support in the elderly. In *Ad Alta-Journal of Interdisciplinary Research*. 8(2). pp. 158-160.

[4] Bing, X., Suocheng, D., Duoxun, B., et al. (2018). Research on the Spatial Differentiation and Driving Factors of Tourism Enterprises' Efficiency: Chinese Scenic Spots, Travel Agencies, and Hotels. In *Sustainability*. Vol. 10, No. 4, 901; https://doi.org/10.3390/su10040901

[5] Borkowski, S., Stasiak-Betlejewska, R. (2016). The importance level of quality management elements in polish construction company development strategy. In *Acta Oeconomica Universitatis Selye*. Vol. 4, No. 1.

[6] Canalejo, C., Del Rio , J. (2017). Quality, satisfaction and loyalty indices. In *Journal of Place Management and Development*. Vol. 11, No. 4.

[7] Casadesús, M., Heras, I. (2006). La gestión de la calidad como sistema de integración. In *Ingeniería concurrente. Una metodología integradora*. Barcelona: Universitat politécnica de Catalunya.

[8] Ceptureanu, E. G., Ceptureanu, S. I., Popescu, D. I., Vlad, L. B. (2017). Two stage analysis of successful change implementation of knowledge management strategies in energy companies from Romania. In *Energies*. Vol. 10, No. 12, p. 1965.

[9] Cooper, C., Fletcher, J., Fyall, A., Gilbert, D., Wanhill, S. (1993). *Tourism: Principles & practice*. Harlow: Longman.

[10] Drossos, D., Tsotsolas, N. V. (2014). Customer satisfaction evaluation for greek online travel agencies. In D. Yannacopoulos, P. Manolitzas, N. Matsatsinis, & E. Grigoroudis (Eds.), *Evaluating websites and web services: Interdisciplinary perspectives on user satisfaction*, pp. 119-137. IGI Global: Hershey.

[11] Dzurov Vargová, T., Gallo, P., Šenková, A., Šambronská, K. (2018). *Manažésrke inovácie v turizme a systém manažérstva kvality. Vydavateľstvo Prešovskej univerzity v Prešove*. 99 p.

[12] Gallo, P., Píchová, R., Šenková, A., Matušíková, D., Mitríková, J. (2017). Techniques and analysis of management audits. *CBU International Conference Proceedings 2017: Innovations in Science and Education*. Vol. 5, pp. 132-137, DOI: 10.12955/cbup.914.

[13] Gúčik, M., Gajdošík, T., Lencsésová, Z. (2016). *Kvalita a spokojnosť zákazníka v cestovnom ruchu*. Wolters Kluwer, Bratislava.

[14] Indrová, J., Houška, P., Petru, Z. (2011). *Kvalita ve službách cestovního ruchu*. 1. vyd. Praha: Oeconomica.

[15] Marcheová, D., Tirpáková, A., Stehlíková, B. (2011). *Základy štatistiky pre pedagógov*, UKF Nitra. p. 405.

[16] Ministerstvo Dopravy, Výstavby a Regionálneho Rozvoja (2015). *Analýza kvality služieb pre vybrané sektory cestovného ruchu*. Bratislava.

[17] Onuferová, E., Čabinová, V. (2018). Enterprise Performance Analysis of the Selected Service Sector by Applying Modern Methods with an Emphasis on the Creation and Application of the Modified Creditworthy Model (MCWM). In *Journal of tourism and services*. 9 (17). pp. 97-122.

[18] Popescu, I. P., Andreica, M., Popescu, M. E. (2018). An it solution to support the managerial decisions in preventing financial failure. In *Quality - Access to Success*. Vol. 19, S1, pp. 406-411.

[19] Šambronská, K., Matušíková, D. Gallo, P., Šenková, A., Mitríková, J. (2016). *Hotel Services - Quality Base of Dimension of Service. BK 2: Political Sciences, Law, Finance, Economics and Tourism* Conference Proceedings. Vol. 4, pp. 307-314.

Data-driven HR Analytics in a Quality Management System

Alexandra POLYAKOVA[1], Vladimir KOLMAKOV[2*], Ilya POKAMESTOV[3]

[1]Dr.Sc (econ.), Professor of Economics, Plekhanov Russian University of Economics, Moscow, Russia;
Industrial University of Tyumen, Tyumen, Russia;
E-mail: agpolyakova@mail.ru
[2]PhD (econ.), Associate professor, Plekhanov Russian University of Economics, Moscow, Russia;
E-mail: vladimirkolmakov@mail.ru
[3]PhD (econ.), Associate professor, Financial University under the Government of the Russian Federation, Moscow, Russia;
E-mail: pokamestov@mail.ru
*Corresponding Author: Vladimir Kolmakov; E-mail: vladimirkolmakov@mail.ru

Abstract

The digital economy forces conventional business practices to transform to a more efficient design. Data-driven management is widely perceived as a growth contributor and performance enhancer to businesses, but statistical evidence of that consensus is always based on a company-specific research followed by its results generalization and extrapolation to a broad sample of enterprises. Businesses nowadays are good at analyzing operational performance and market data, but the human resource management subsystem – significantly influential on overall quality of business process management – lacks data support, thus innovative data driven HR management systems become highly demanded. Prerequisites for HR transformation, new expectations and requirements for HR management under changing conditions are considered in the paper. Particular attention is given to potential of big data application to enhance quality of management. Correlations between ICT expenditure and returns on sales and assets being the most frequent metrics of management quality are examined. Since investment in ICT can cover different segments of companies' operations, we suggest the growth path for management quality through modernization of HR operations as part of recruitment, selection and performance appraisal employing big data. A possible model for integration of a big data collection and processing module into an HR management system in order to improve quality of HR analytics is suggested. Based on results of the empirical research, a data driven HR analytics subsystem was designed. Concluding remarks present promising applications of data driven HR analytics aimed at HR efficiency improvement and at overall management quality growth.

Keywords: *management quality; business processes; HR analytics; digital economy; big data.*

1. Introduction

Modern management is based on continuous improvement of business operations, which requires determination, description and optimization of business processes. Business processes are thought to be the basis of a corporate value chain and to determine company's competitiveness and management quality (Polyakova *et al*., 2018).

Business process optimization implies an increase in value added at each stage of a product life cycle. It means that a process is designed not to have downtime, to minimize material flows, to eliminate return flows and cross flows as well. Another contributor to "quality – performance – competitiveness" triad is a set of supporting business processes enabling, servicing and facilitating the core ones. They are generally meant not to involve product development or end-user interactions. HR management is a proper case of a support process.

Along with the Big Data introduction to business society, many brand-new issues of management quality assessment have arisen: many commonly perceived concepts from individually assessed ones became fully operational, measurable and thus manageable due to the new ability to collect data and formalize a business process description. Human resources management is one of the biggest beneficiaries of this development: modern HR analytics is less considered as an HR element related to the use of advanced analytics algorithms and becomes, largely, a component of business analytics aimed at business process improvement. Therefore, analytical procedures become less focused on problems and indicators used by HR departments, such as employee retention, engagement, training and recruiting metrics, and move to solving business problems, such as sales efficiency, workforce productivity, employee retention, etc. Thus, quality management is becoming a more solid and tangible construction facilitated by expanding data acquisition and processing possibilities.

We intend to contribute to the theory and practice of quality management systems' enhancement by measuring the potential response of businesses' performance to data tools implementation formalized as ICT expenditure. Our basic **hypothesis** is the following: *since quality depends on human resources (HR) especially in the labor-intensive industries and businesses, improvements to HR-analytics (and business processes consuming it) can facilitate quality growth*. Then, the research design is proposed to follow the stepwise procedure:

Step 0. Introduce assumptions

A) given the triad of "quality – performance – competitiveness", denote each one a combination of the other two. Thus, quality can be denoted as the function of performance and/or competitiveness; then the increase of performance indicates the increase of quality. Return on sales (operational

performance) and Return on assets (overall performance and competitiveness) will be used as the model function;

B) assume companies' information and communication technology (ICT) expenditure an argument reflecting the data-driven technologies introduction, since no other verifiable data is available;

Step 1. Measure performance indicators' response to ICT expenditure using industry averages. The background for this step is the common sense that industries are labor-intensive to a different extent, along with the significance of potential data related expenditure. That is why interrelation between ICT expenditure growth and performance positive changes is not obvious;

Step 2. Select industries most sensitive to ICT introduction and the most labor-intensive (using a share of wages in total cost of operations). Presumably, the more labor-intensive industries will be the ones that are more beneficial from data driven HR management.

Step 3. Design a system of data-driven HR-management for quality. Design of an HR analytics subsystem based on big data analysis

Theoretical premises of quality management improvement under the data-driven HR analytics are contained in the significant potential of digitalization and big data operationalization, which applied to HR management can increase the overall quality by resolving the following issues:

1. Career decisions: conventional practices of recruitment, dismissal or promotion decisions employed IQ tests, practical skills tests, professional exams and even competitive examinations during probation period. But, recently, big data have become a new approach to "smart" recruitment, which allows to choose between two or more fit applicants and to find the best fit.

2. Headhunting: seeking employees can be labor-intensive and, hence, expensive. A need for reduction of these expenses while improving personnel selection is determined by a general focus on lean manufacturing and optimization.

3. Appraisal: HR information sources have vast data sets. Advertisement databases, social media and professional forums cannot be efficiently studied or analyzed manually.

4. Anti-fraud: certain occupations or positions are low-sensitive to an education level of applicants (e.g. any college graduate can be hired as a public employee), and some jobseekers with more developed communication skills take advantage of it. There are methods and recommendations which help to deceive a recruiter and succeed at almost any interview occasionally through deception. These days, such applicants are identified mainly in a subjective manner. Data-driven HR can facilitate in resolving this problem.

5. Many other company-specific HR management issues may be contributed by data-driven analytics.

2. Literature Review

The dependency of managerial decision quality on data availability and the ability to analyze information is obvious. The modern economy generates huge volumes of data on performance parameters of different entities. Proper analysis of this information can ensure a shift from specific tasks to more global problems such as economic modernization (Polyakova and Simarova, 2014), improvement of macroeconomic stability or an increase in productivity of economic sectors through network and cluster effects – to increase quality in majority of its dimensions.

The term 'big data' is quite controversial as seen in Lele (2019) who found up to forty different definitions of the term. There are authors who believe that it should be considered as a characteristic of accumulated data quantity (Shobana and Kumar, 2015). Furthermore, sometimes it is understood as all the data in the world. Others also include storage, computing technologies and services that are data driven or data consuming (Marx, 2013). As a rule, the term 'big data' means a social and economic phenomenon related to technological opportunities of significant data volumes analysis (McAfee and Brynjolfsson, 2012). We strive to interpret big data as a *set of approaches, tools and methods for processing structured and unstructured data*.

Since big data are characterized by huge volumes, variety and speed of updating, they require in-depth analysis methods. In general, special aspects of big data application are as follows:

- in most cases, multiple combinations are looked through in order to draw conclusions;
- the entire data set is analyzed rather than a sample;
- machine algorithms are applied for analysis, standard tools (Excel, etc.) are not appropriate;
- work with big data includes multiple stages as extraction, review, limitation, standardization, transformation, visualization, interpretation and reanalysis with different methods (Fan *et al*., 2014).

One of the earliest linkages of quality management and supportive infrastructure, as a prologue to big data integration in decision-making processes, was shown in Flynn *et al*. (1995) who incorporated two measures of quality performance and their role in establishing and sustaining a competitive advantage and proved that top-management support and HR management were among the important infrastructure components in terms of quality management. According to Powell (1995), quality management is seen as a potential source of sustainable competitive advantage, yet not directly but through "employee empowerment, and executive commitment" – outcomes of HR practices' implementation. This argument is very strongly supporting our methodology since human resource management is not considered a direct sphere of quality management interest. Another survey concluded with the same outcome: "leadership, management of people and customer focus were the strongest significant predictors of operational performance… and could produce competitive advantage more strongly than TQM tools and techniques" (Samson and Terziovski, 1999). The latter also proves our "quality – performance – competitiveness" triad. It has much evidence in published research, e.g. Easton and Jarrell (2002) found that performance, measured by both accounting variables and stock returns, is strongly interrelated to quality management practices implementation. Formalization of performance implications of adopting quality management is also provided by Nair (2006), Kaynak (2003).

Since HR practices influence and drive quality, the current trends and prospects of big data application in HR processes must be considered. Since the exponential growth of the number of companies using big data analytics is anticipated, investment in data infrastructure is a significant factor of corporate competitiveness. In Angrave *et al*. (2016) HR analytics is considered as a 'must have' capability that will ensure HR's future as a strategic management function. This thesis is not only confirmed but has its follow-up. This opinion is supported in Martin-Rios *et al*. (2017) who introduced the new HRM metrics from a combination of a traditional format case study and innovation data spreadsheets: they combined the strategic dimensions of HRM with practice-driven data analysis anchored in HR analytics and HR big data mining.

HR transformation in the digital economy is not questioned by the scientific community. It is seen as a matter of course, while experts are more concerned about new technology implementation time, feasibility of technological solutions and system architectures, as well as risk mitigation during introduction of technological innovations. The most important trend is a fast move from descriptive analytics based on explanation of past events to predictive analytics. Examples of the latter found in Voronkova *et al*. (2018). In that case employee turnover assessment and description are transformed into a task pf predicting the extent of outflow, its reasons and employees' reaction to internal or external changes. Shah *et al*. (2017)

provide a case of a contextual big data application to HRM issues: they use structural equation modelling to identify influence of salary, job promotion, organizational loyalty and organizational identity on employees' job satisfaction suggesting and mediating employee readiness for organizational change. They highlight how, where and why such a normative approach to employee factors may be limited and introduce a framework combining big data principles, implementation approaches and management commitment requirements to assess employees' attitude and behavior as part of wider HR predictive analytics approaches.

El-Kassar & Singh (2018) measure impacts of green innovations on productivity and competitive advantage, taking into account management commitment and HR practice as well as the use of big data in these relations. The paper is among the first ones to deal with such a complex framework which considers the correlation of numerous constructs and their effects on competitive advantage as well as overall organizational performance. The authors tested a model that depicts and examines the relationships among green innovation, its drivers, as well as factors that help overcome the technological challenges and influence the performance and competitive advantage of the firm.

Therefore, big data employment has a significant potential of quality management systems development. Relevant proof comes from Samim *et al*. (2018), who examined the antecedents and influence of big data decision-making capabilities on decision-making quality under proposal that such capabilities are influenced by big data management challenges. Earlier studies in healthcare and pharmaceuticals (Djali *et al*., 2010) describe the development of a quality management system based on a data-driven strategy: an electronic information management system was introduced to monitor and manage cost and timelines while ensuring the quality of clinical research operations using big data infrastructure. Alternatively, Li *et al*. (2017) provide a solution to accomplish deep-level quality management based on big data analytics.

3. A Model of Performance – Quality Interrelation

3.1. Method and Data

Since we assume companies' ICT expenditure an argument reflecting the data-driven technologies introduction, the model is meant to test the following hypothesis: *improvements to HR-analytics formalized as the extent of business processes computerization leads to performance increase, and Influence from business digitization is statistically significant for all industries.*

We suggest using panel regression modelling, since it is the most consistent with the cross-sectional data: it allows to valuate relations between variables that change over time but not across entities – to regard individual heterogeneity. The generalized model notation is the following:

$$y_{it} = \alpha + x_{it}^{T}\beta + u_{it} \quad i = 1,..., N, \quad t = 1,..., T$$

Panel or cross-sectional time series data consist of observations over the same objects in successive periods. Key advantages of these data are determined by the following opportunities which they give:

- multiple observations while increasing the number of degrees of freedom, reducing collinearity between explanatory variables and, hence, improving efficiency of assessment;
- analysis of numerous important economic processes and phenomena which cannot be described by integral time series, as well as spatial data analysis;
- bias exclusion which is inevitable both in times series analysis (where time evolution of an average representative item is considered) and in spatial series analysis (where unobserved individual characteristics of items are not considered);
- tracking individual evolution of item' characteristics across time.

We used cross-sectional (panel) data of the nine Russian industries observed through 2010-2016. The dataset was intended to test two dependent variables – return on sales (ROS) and return on assets (ROA) – regressed by average ICT expenditure per company in a given industry (Table 1).

Industry	ICT expenditure, thousands of rubles per company	ROS, %	ROA, %
Construction	7,450.0	5.5	1.9
Power generation	4,970.0	7.8	5.1
HoReCa	2,479.0	6.1	6.1
Manufacturing	5,961.0	10.5	6.6
Mining	19,846.0	27.2	10.0
Real estate	4,145.0	12.6	5.5
Telecoms	73,640.0	18.2	7.6
Transportation	8,483.0	10.8	5.3
Wholesale and Retail	5,935.0	5.3	6.4

Table 1. The 2016 averages of data employed (Abdrakhmanova et al., 2018)

Analysis shows that there is a positive dependence between performance ratios and quality management (through ICT expenditure): profitability ratios increase as a company average ICT grows (see Figure 1).

There is no evidence on the causality between these two metrics, because profitability growth can be both a consequence and a reason of increased ICT expenditure. Granger causality test could be instrumental for this, but still we impose an assumption that returns are dependent on ICT expenditure.

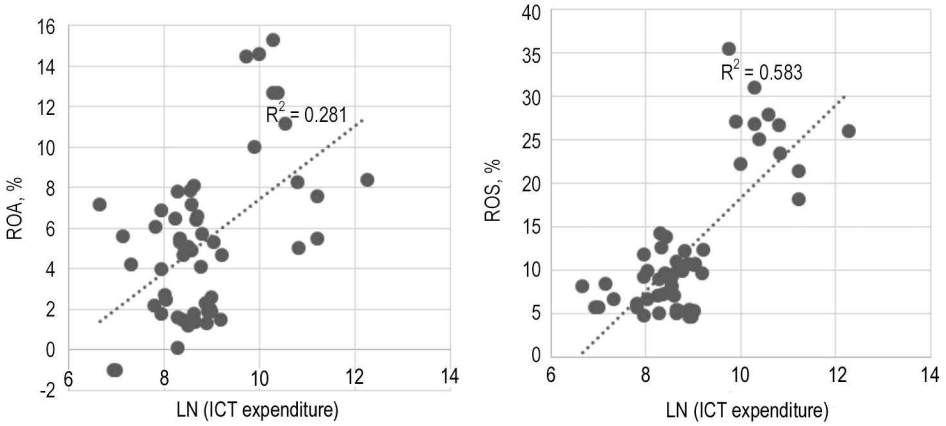


Figure 1.
Dependency of return on assets (left) and return on sales (right) on average ICT expenditure per company

3.2. Results and Discussion

We ran panel regression model tests using GRETL software package to estimate parameters of ICT to ROA/ROS interrelation. At the first iteration we used Random Effect (RE) models to check if differences across industries had some influence on their return ratios. The logic to use RE model instead of Fixed Effect (FE) model was that the variation across industries might be assumed as random and uncorrelated with the argument.

RE models' results disproved the random variation between industries as models appeared statistically insignificant failing tests to RE applicability (Hausman test and Breusch-Pagan test). Table 2 discloses main outcomes of RE models.

Dependent variable	ROA	p-value	ROS	p-value
Intercept	0.434386	0.9394	6.95612	0.4007
Regression coefficient with the argument ln(ICT)	0.555436	0.3826	0.599642	0.5114
Schwarz criterion	298.1164		378.0636	375.6198
S.D. dependent var	3.882022			
S.E. of regression	3.585415			
Akaike criterion	294.1384			
Hannan-Quinn	295.6725			
Breusch-Pagan test				
Chi-square(1)	36.9375		42.3224	
p-value	1.21975e-009		7.74029e-011	
Variance of the unit-specific error = 0	True		True	
Hausman test				
Chi-square(1)	5.8998		22.7342	
p-value	0.0151426		1.86028e-006	
GLS estimates are consistent	True		True	

Table 2. RE model estimates for ROA / ROS dependency on ICT expenditure

The ROA model estimates' p-values are far above 0.05 meaning that regression results are close to spurious. Breusch-Pagan test indicates no variance of the industry-specific error, as well as Hausman test indicates that ordinary least squares model is consistent with the data. All the latter means it is necessary to use Fixed Effect models of panel regression on the data.

At the second iteration we used Fixed Effect (FE) models to analyze the impact of the variable that varies over time by removing the effect of time-invariant characteristics attributable to the argument thus enabling assessment of the net effect of the predictor on the function. The FE models of panel regression showed that ICT expenditures had a significant and positive impact on ROS – an operational efficiency indicator, and the influence of the argument on ROA, i.e. general performance, is statistically insignificant.

Dependent variable	ROA	p-value	ROS	p-value
const	12.7939	0.0962	27.9754	0.0014
ICT_ln	−0.841114	0.3276	−1.77541	0.0622
LSDV R-squared	0.765563		0.934638	
LSDV F(9, 44)	15.96487		69.90843	
Log-likelihood	−110.1959		−114.9477	
Schwarz criterion	260.2816		269.7852	
rho	0.176970		0.382272	
Within R-squared	0.021785		0.076820	
Akaike criterion	240.3917		249.8953	
Hannan-Quinn	248.0624		257.5661	
Durbin-Watson	1.347175		0.883423	

Table 3. FE model estimates for ROA / ROS dependency on ICT expenditure

Despite the significant coefficient of determination, random estimates for the ROA model are highly probable as p-values are significantly above 0.05. The 'rho' coefficient indicating the intraclass correlation shows that only 17.7% of the ROA variance is due to differences across industries, while the same for ROS is twice bigger – 38.2%.

Therefore, the model confirms that ROS is dependent on ICT expenditure, and there are certain differences by industries: according to the distribution of residual, mining and telecom industries are less exposed to positive impacts from ICT investment (Figure 2).

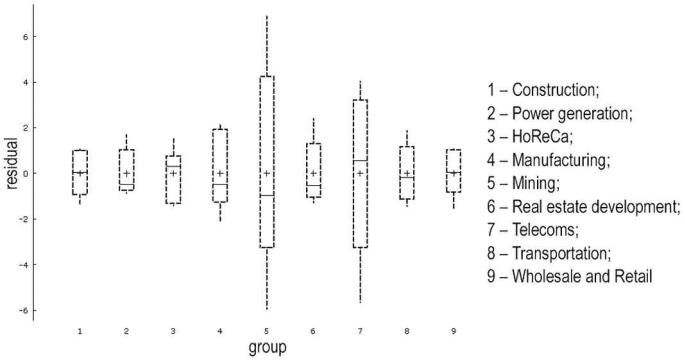


Figure 2. Distribution of residuals by industries

All industries demonstrate a positive correlation with ICT investment increase to different extents. The ones with lesser variance of residuals distribution are more responsive to technology integration to their business process management. Alternatively, mining and telecommunications companies are more technology-oriented and already have a more significant extent of ICT exposure, and data management is a part of their operations.

According to the main hypothesis, labor-intensity is not a key factor determining response to technology introduction. Still, quality improvements through data management infrastructure as an element of ICT are positively influencing performance.

4. The Design of a Data-driven HR Analytics Subsystem

As seen in the literature review, data driven HR analytics subsystem is highly welcome to become a part of enterprise management system. It is expected to facilitate validation of a new decisions-making and performance appraisal model introduction projects. The model should enable HR diagnostics and control, consolidation of HR-related information in a single database, HR management coordination, task allocation, and recording of measures taken in response to changes in employee behavior models.

An important stage of a big data system design is its structure optimization, which means a choice of data storage and distribution methods. It is necessary to consider specific features of requests and system structure optimization methods. An overall visualization of HR analytics and big data processing in an enterprise management system is outlined in Figure 3.

The key stages of data driven HR analytics include the following ones:

1. Data parsing. To gather data effectively, data sources should be determined considering their different parameters such as refresh rate, quantity of data, transfer rate, data type and its reliability.

Data format largely depends on the data sources used. Today, management-relevant data sources are the exponentially increasing text volumes from the Internet, internal reports, contracts, correspondence, corporate knowledge bases, reference data, structured databases on customers, partners, projects, deals, etc. All data sources can be classified as follows:

- ❑ open data and web resources;
- ❑ business data: CRM, loyalty programs, etc.;
- ❑ M2M technologies and the Internet of things;

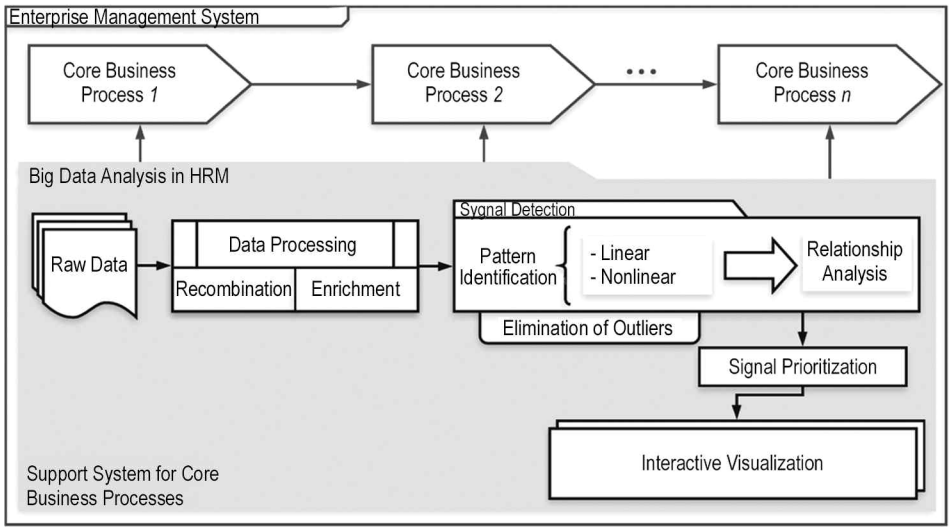


Figure 3.
Big data processing within an enterprise management system

- ecosystem: data purchase or cooperation with another organization (depends on a company's big data strategy).

However, about 90% of all data available to managers is irrelevant in terms of making well-informed decisions and knowledge creation. Knowledge relying on a functional information model leads to actions, i.e. allows a transition from a reactive (analytical) models to a proactive (synthetical) models, plans and estimates. To improve that knowledge, new data opportunities regarding the human resources can be brought by data gathered from popular social media, review websites, forums, blogs and online media.

Big data parsing has special features and requires a special parser for every source. These algorithms are often called 'data crawlers' (to gather data on the Internet) and 'data acquisition' procedures. Data parsing includes preliminary preparation of data as well. At this stage data can be rescaled, standardized, transformed, classified and validated without changing the information.

2. Data collection, cleansing and storage. Data collection is related to direct interaction with storage systems. Current data storage technologies are flexible storage solutions and technologies, which give high scalability and availability, immediate access. Special data collection and preparation technologies include continuous multithread collection and distributed parallel processing in real time. Data collection involves identification of a point where the collected data are labelled by local metadata and stored. In certain cases, they can be processed again. If data do not pass through this point, they will not be analyzed.

While using big data, it is necessary to address an important problem of multiple information sources where data are structured differently and include contradictions. These issues make decision-making more complicated, since it will be difficult to analyze this information thoroughly and results are highly likely to be unreliable. Therefore, data collection and storage should involve data cleansing, which is the process of intellectual sorting, structuring, trimming (to exclude repeating data), cross-verification (to exclude contradictions). Well-known data cleansing solutions are Data Distillery (FICO solutions), which Signal Box, a valuable product, is based on. Signal Box identifies implicit dependence between different parameter blocks in data sets.

3. Online analytical processing (OLAP) and data mining. OLAP discovers primarily descriptive characteristics: frequency and context of a person's mentions in terms of qualities or works, comparing to competitors, key actors who discuss the person or events, attitude to the person or a process (connotation of reviews), data of actors included in target audience (names, age, location, etc.). OLAP should involve report generation based on the following capabilities:

- social media monitoring;
- linguistic analysis of aggregated posts to find required objects or attributes;
- assessment of user comments about an object or process;
- identification and measurement of indirect impacts determined by attitude of sample members to an object in connection with their attitude to another object (e.g. matching an individual and an organization that the individual is associated with);
- listing significant objects/subjects and desired attitude of social group members to listed objects/subjects;
- calculation of indicators of social groups' attitude to objects/subjects/processes from the list;
- notifying employees who deal with a data analytics system of a deviation (or non-compliance) of attitude to an object/subject from a stated/desired level.

Data mining has significant opportunities, since it involves new methods and combines behavioral psychology with statistically reliable methods. It gives more information on behavior of an individual and its competitors. In data mining, a typology of individuals is made using gathered metadata and a selected criteria system. Since there is a lot of information about psychological types of social media users, it is possible to determine potential behavior of an individual through comparison of his/her data with the other people's behavior. In fact, data mining algorithms use individual's data to discover the most probable reactions of an actor. Generally, models built on big data have more predictive capabilities, because, being a part of social communication, individual's behavior always expresses his/her personality, and that is why it is easily predictable. While making decisions, an individual considers only up to seven-nine objects and up to four parameters (Lepora, 2018). Big data and artificial intelligence have no ego features and, consequently, limitations which are typical for personalities, but can predict behavior very accurately. So, the identification of personality traits is built on outcomes of a brain's work. Although people think that they behave differently, artificial intelligence using big data confirms that individuals' reactions are extremely limited. It means that artificial intelligence can identify future needs and reactions of individuals before they do it.

As for current data processing technologies used to develop algorithms of big data collection, processing, filtering and analysis, the two large groups can be determined:

(1) search for implicit dependence (data mining);

(2) spatial analysis, text mining, and pattern recognition are determined.

There are different data processing methods, including predictive analytics, request and report facilities, modeling tools using math analogies, datacasting, analytical processing, etc. All these methods are related to specific algorithms determined by analysis objectives. Analytical processing can be applied to images, contact networks, location data, texts, statistics, voice

data. The methods include both traditional analytical tools and modern machine learning methods which ensure deeper and less clear outcomes: A/B testing, association rule mining, classification, cluster analysis, data fusion, data mining, integrated machine learning method, genetic algorithms, network analysis, optimization, pattern recognition, text sentiment analysis, signal processing, spatial analysis, directed learning, etc. In certain cases, data modelling can be applied. Modelling technologies include artificial intelligence, cognitive neural networks and predictive modelling.

When neural networks are applied, data analysis involves dynamic learning models with use of different data sets. For example, a submodule for analysis and network activity prediction in a media environment, based on network analysis, can be developed to solve the following tasks: search for optimal information paths and interactions between actors, search for information paths by criteria, the shortest path, identification of actors related to newsworthy events, etc.

4. Visualization of data and analysis results. Data analysis results can be used differently (Figure 4).

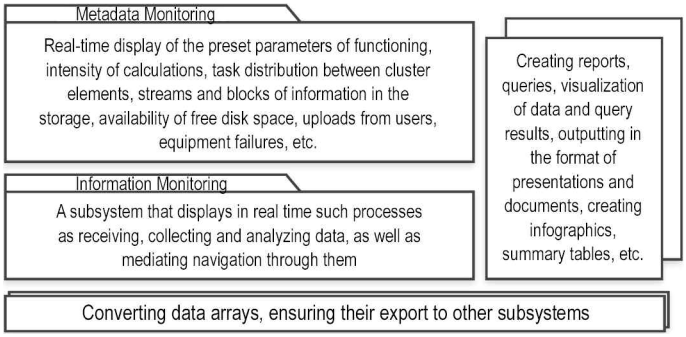


Figure 4.
Data representation and the use of big data analysis results

An important stage is selection of parameters which correspond to an HR policy and are applied to form analytics. HR metrics and their calculation periods are determined according to set objectives. Major metrics are focused on time, price and quality. For each HR metric, there should be a data set which describes certain key job positions or groups of them.

5. Conclusion

Today HR analytics is applied to address different business issues. Recruitment remains the main area, succeeded by labor productivity measurement, compensation payments, HR planning and reduction of employee turnover (Collins *et al*., 2017). There is an explosive growth in the usage of organizational network analysis (ONA) and 'interaction analysis' (employee behavior research) in order to discover a potential increase in business performance.

Major HR analytics applications to improve quality and performance of a business are as follows:

1. Assessment, prediction and reduction of employee turnover. Now, heads of companies begin to control employee retention and engagement assessment, since these factors are significant and influence performance indicators. Modern models can predict voluntary discharge based on data on behavior in social media only.

2. Improved interaction with employees. Companies apply data driven HR analytics to find ways to improve personnel engagement and retention. For example, a company discovered that almost equal remuneration encouraged mid-level specialists and persuaded top employees to search for a new job.

3. Expanding sources of talent and hiring improvement. Having analyzed job interview and tests data, Google revealed that, in most cases, each job interview after the fourth job interview had not played a significant role and had been largely useless. It led to simplification of the recruitment.

4. Furthermore, data driven HR analytics is applied to create profiles of highly effective sales and client managers. For example, Oracle and ADP analyze sales efficiency based on personnel characteristics. Using these models, they can make the most rational decisions in recruitment, sales planning and identification of potential bestsellers (Bennett and Collins, 2015).

HR areas where big data can be applied are limited. Data gathered in HR departments (productivity, absence rate, training time, qualification, recruitment costs, etc.) allow companies to assess internal past indicators rather than to pay attention to future changes and prospects both in the internal and external environment. Many HR specialists still focus on data rather than on business problems.

As for HR technology trends, there is an increase in demand on and significance of feedback, quick surveys and analytical tools for making HR departments more efficient. Employers are especially aimed at permanent engagement measurement, not at annual metrics.

Therefore, in terms of potential big data analytics introduction, there are HR management areas of great interest:

- Recruitment: vast unstructured data volumes received by HR departments (social media accounts, photographs, comments) allow them to analyze and find the best applicants;
- Analysis of internal communications (emails, phone calls, calendars, business chats, etc.) to identify threats, assess motivation, etc.;
- Scheduling – workload analysis based on historical data and suggesting shift plans.

References

[1] Abdrakhmanova, G., Vishnevskiy, K., Volkova, G. and Gokhberg, L. (Eds.) (2018). *Digital Economy Indicators in the Russian Federation*: 2018, Moscow. Retrieved from https://www.hse.ru/data/2018/08/20/1154812142/ICE2018.pdf.pdf.

[2] Angrave, D., Charlwood, A., Kirkpatrick, I., Lawrence, M. and Stuart, M. (2016). "HR and analytics: why HR is set to fail the big data challenge", *Human Resource Management Journal*, Vol. 26, No. 1, pp. 1–11.

[3] Bennett, C. and Collins, L. (2015). *HR and People Analytics: Stuck in Neutral, Global Human Capital Trends 2015*, Retrieved from http://www2.deloitte.com/us/en/pages/human-capital/articles/employee-engagement-culture-human-capital-trends-2015.html.

[4] Collins, L., Fineman, D. and Tsuchida, A. (2017). *Rewriting the Rules for the Digital Age: 2017 Deloitte Global Human Capital Trends*, Report, Retrieved from https://doi.org/10.1016/j.neuro.2014.04.002.

[5] Djali, S., Janssens, S., Van Yper, S. and Van Parijs, J. (2010). "How a Data-Driven Quality Management System Can Manage Compliance Risk in Clinical Trials", *Therapeutic Innovation & Regulatory Science*, Vol. 44, No. 4, pp. 359–373.

[6] Easton, G.S. and Jarrell, S.L. (2002). "The Effects of Total Quality Management on Corporate Performance: An Empirical Investigation", *The Journal of Business*, Vol. 71, No. 2, pp. 253–307.

[7] El-Kassar, A.N. and Singh, S.K. (2018). "Green innovation and organizational performance: The influence of big data and the moderating role of management commitment and HR practices", *Technological Forecasting and Social Change*, article in press. Retrieved from https://doi.org/10.1016/j.techfore.2017.12.016.

[8] Fan, J., Han, F. and Liu, H. (2014). "Challenges of Big Data analysis", *National Science Review*, Vol. 1, No. 2, pp. 293–314.

[9] Flynn, B.B., Schroeder, R.G. and Sakakibara, S. (1995). "The Impact of Quality Management Practices on Performance and Competitive Advantage", *Decision Sciences*, Vol. 26, No. 5, pp. 659–691.

[10] Kaynak, H. (2003). "The relationship between total quality management practices and their effects on firm performance", *Journal of Operations Management*, Vol. 21, No. 4, pp. 405–434.

[11] Lele, A. (2019). "Big data", *Disruptive Technologies for the Militaries and Security*, Springer Nature Singapore, Singapore, pp. 155–166.
[12] Lepora, N.F. (2018). "Decision making", in Prescott, T.J., Lepora, N.F. and Verschure, P. (Eds.). *Living Machines: A Handbook of Research in Biomimetic and Biohybrid Systems*, Oxford University Press, Oxford. Retrieved from https://doi.org/10.1093/oso/9780199674923.003.0028.
[13] Li, X., Tu, Z., Jia, Q., Man, X., Wang, H. and Zhang, X. (2017). "Deep-level quality management based on big data analytics with case study", *Proceedings – 2017 Chinese Automation Congress, CAC 2017*, pp. 4921–4926.
[14] Martin-Rios, C., Pougnet, S. and Nogareda, A.M. (2017). "Teaching HRM in contemporary hospitality management: a case study drawing on HR analytics and big data analysis", *Journal of Teaching in Travel and Tourism*, Vol. 17, No. 1, pp. 34–54.
[15] Marx, V. (2013). "The big challenges of big data", *Nature*, No. 498, pp. 255–260.
[16] McAfee, A. and Brynjolfsson, E. (2012). "Big data: The management revolution", *Harvard Business Review*. Retrieved from https://hbr.org/2012/10/big-data-the-management-revolution.
[17] Nair, A. (2006). "Meta-analysis of the relationship between quality management practices and firm performance-implications for quality management theory development", *Journal of Operations Management*, Vol. 24, No. 6, pp. 948–975.
[18] Polyakova, A.G., Akhmetshin, E.M., Goloshchapova, L. V., Rakhmeeva, I.I., Noeva, E.E. and Rakovskiy, V.I. (2018). "A Model of Regional Economic Space Modernization", *European Research Studies Journal*, Vol. XXI No. SI2, pp. 624–634.
[19] Polyakova, A.G. and Simarova, I.S. (2014). "The conceptual model of a region development administration considering the level of spatial relatedness", *Economy of Region*, Vol. 10, No. 2, pp. 32–42.
[20] Powell, T.C. (1995). "Total quality management as competitive advantage: A review and empirical study", *Strategic Management Journal*, Vol. 16, No. 1, pp. 15–37.
[21] Samson, D. and Terziovski, M. (1999). "Relationship between total quality management practices and operational performance", *Journal of Operations Management*, Vol. 17, No. 4, pp. 393–409.
[22] Shah, N., Irani, Z. and Sharif, A.M. (2017). "Big data in an HR context: Exploring organizational change readiness, employee attitudes and behaviors", *Journal of Business Research*, Vol. 70, pp. 366–378.
[23] Shamim, S., Zeng, J., Shariq, S.M. and Khan, Z. (2018). "Role of big data management in enhancing big data decision-making capability and quality among Chinese firms: A dynamic capabilities view", *Information and Management*, article in press. Retrieved from https://doi.org/10.1016/j.im.2018.12.003.
[24] Shobana, V. and Kumar, N. (2015). "Big data – A review", *International Journal of Applied Engineering Research*, Vol. 10, No. 55, pp. 1294–1297.
[25] Voronkova, O.Y., Zadimidcenko, A.M., Goloshchapova, L. V., Polyakova, A.G., Kamolov, S.G. and Akhmetshin, E.M. (2018). "Economic and mathematical modeling of regional industrial processes", *European Research Studies Journal*, Vol. XXI, No. 4, pp. 268–279.

Analysis of Influence of the Quality of Specialist Training on Social and Economic Development

Olena PAVLENKO[1], Viktoriya MARTYNETS[2], Olga DREVAL[3], Denys SMOLENNIKOV[4]

[1]Corresponding author, Department of Management, Sumy State University, Sumy City, Ukraine;
E-mail: o.pavlenko@management.sumdu.edu.ua
[2]Department of Management, Sumy State University, Sumy City, Ukraine; E-mail: v.martynets@management.sumdu.edu.ua
[3]Department of Management, Sumy State University, Sumy City, Ukraine; E-mail: o.dreval@management.sumdu.edu.ua
[4]Department of Management, Sumy State University, Sumy City, Ukraine; E-mail: dos@management.sumdu.edu.ua

Abstract

The article analyzes the influence of the quality of specialist training on social and economic development, both at the local and at the national level. Based on the growth pole theory and chain method of substitutions, the interdependence between qualitative indicators of specialist training and quantitative indicators of social and economic development has been investigated. The hypothesis of existence of dependence "quality of specialist training – labor market indicators – GDP" has been proved.
A competency-based approach is used to assess the quality of specialist training. Based on the survey carried out among the graduates who studied by master's degree programme "Management of Organizations and Administration", the quality of the specialist training is determined by assessing the importance of their competency in employment and professional activities. The economic and mathematical model is developed and the dependence between the indicators of social and economic development and the quality of specialist training is established. It is proved that the quality of specialist training should be the basis of social and economic development both at the local and at the national level.

Keywords: *quality of specialists training; competency; labor market; GDP.*

1. Introduction

Obtaining knowledge is the main step to success. This concerns any field of activity. High-quality education is a start element for the social and economic development of the territory, both at the local level and at the level of the whole country (Aghion, P. et al., 2009; Kostyuchenko, N. et al., 2015; Kobzev Kotásková, S. et al., 2018; Telizhenko, O. et al., 2019; Bilan, Y. et al., 2019). It is known that the generally accepted indicator of a country's development is GDP. Therefore, the purpose of this study is to determine the interdependencies that determine the growth of the GDP indicator due to the growth of the quality indicators of specialist training.

This study is based on the use of growth pole theory (Solow, R. M., 1956) with applying chain method of substitutions and other methods of economic analysis (Kim, J. O., & Mueller, C. W.,1978; Bilan, Y. et al., 2019). Each stage of the chain of this study is connected with the analysis of qualitative and quantitative indicators characterizing social and economic situation from the micro level (quality indicators of specialists training) to the macro level (GDP indicators). At the same time, the assessment of indicators of each next stage is caused by the influence of indicators of the previous stage.

In the study, the basic point of social and economic growth is the quality of specialist training at the education institutions, which corresponds to the main provisions for quality assurance standard in the European Higher Education Area (European Association for Quality Assurance in Higher Education (ENQA), 2015).

Issues of education quality management were investigated in the works of such scientists as Brookes, M., & Becket, N., 2007; Kanji, G. K. et al., 1999; Sallis, E., 2014; Wani, I. A., & Mehraj, H. K., 2014.

According to the Law of Ukraine "On Education" (2017), the quality of education is "the compliance of learning outcomes with the requirements established by law, corresponding to the standard of education and/or the contract for the provision of educational services".

2. Literature review

To assess the quality of specialist training, education institutions apply the competency-based approach, which is key one in the European education area.

Bierne, J. et al., (2017, May) consider the competency-based approach in terms of the influence of learning methods on the development of students' competency. They discover the relationship between learning methods, learning outcomes and competency.

A historical review of the implementation of competency-based learning is conducted by Butova, Y. (2015). The scientist studies the stages of formation and characteristics of the competency-based approach, starting with the use of the competency-based approach in linguistic education and integration into other areas of education.

Kunanbayeva S. S. (2016) considers specific features of the implementation of competency-based approach into higher education system as one of the methodological foundations of the education modernization (case study of Kazakhstan).

Mekovec, R., Aničić, K. P., & Arbanas, K. (2018) study the

use of competency-based approach for students of the specialty "Information and communication technologies". The learning environment is considered on the basis of the principle of problem-based learning and is aimed at obtaining general competencies.

Velde, C. (1999) puts the emphasis on the specific features of lifelong learning. It shows the role of a competency-based approach to learning in the context of rapid changes in the external environment.

Zaytseva, T. (2016) considers that the essence of the competency-based approach consists in the fact that education should provide "not isolated knowledge and skills" but the students' ability and readiness for professional activities in various conditions of institutional environments. The transition from principle "to form knowledge and skills" to the principle "to form professional competence" should be held through competency-based approach.

Competency and learning outcomes are the starting point in the assessment of training by certain education programmes. According to the Law of Ukraine "On Higher Education" (2014), a competency is considered as a "dynamic combination of knowledge, skills and practical skills, ways of thinking, professional, worldview and civic qualities, moral and ethical values, which determine a person's ability to successfully carry out professional and further educational activities and is the result of training at a certain level of higher education"; learning outcomes are interpreted as – "a set of knowledge, skills, other competencies acquired by a person in the process of learning according to a certain educational and professional, educational and scientific programme that can be identified, quantified and measured".

The ideal situation is when the expected learning outcomes of the educational programme of an education institution (developed by teachers) coincide with the vision of employers in relation to the competencies that employees of companies must have, as well as the desired competencies for students.

The quality of training will depend on the correlation between the following elements of education and assessment, namely: learning outcomes – learning methods – assessment methods. Learning outcomes determine learning methods, and assessment methods are formed in accordance with them. It is clear that for different educational programmes not only learning outcomes will be different but also learning and assessment methods.

The quality of specialist training by education institutions also depends on the degree of harmonization of education programmes with the external environment. The main task for education institutions in this case is the constant monitoring and improvement of educational programmes to meet the labor market with highly qualified specialists.

Hypothesis 1: The quality of specialist training is the basis of social and economic development.

3. Method

According to the hypothesis of the study, based on the growth poles theory, the result of the quality of specialist training is the growth of GDP. There are four stages in such study chain and they are shown in Figure 1.

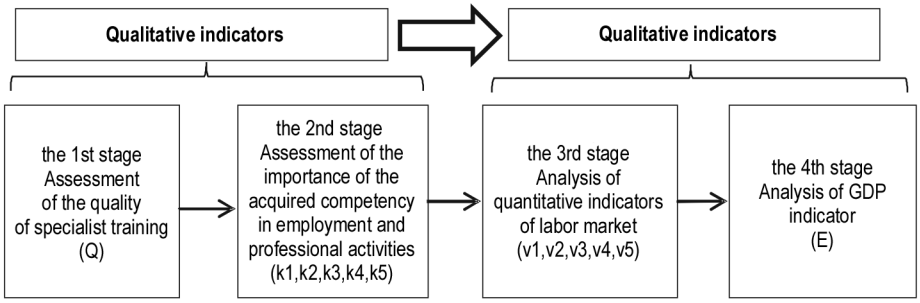


Figure 1. Stages of the chain of the influence of quality of specialist training on the social and economic development

A group of qualitative and quantitative indicators has been suggested for each stage. Let's consider them.

The 1st stage. The assessment of the quality of specialist training is carried out by teachers on the basis of scoring (Q) by all courses (n) within the framework of educational programmes at education institution. In Ukraine, knowledge assessment is carried out by a 100-point scale with subsequent transfer into a 5-point scale. This corresponds to the assessment of knowledge in European countries under the Bologna Declaration. A quantitative assessment of the quality of specialists training can be represented as an average score (Q aver) that a student receives for the entire period of study.

The 2nd stage. Qualitative assessment carried out by graduates on the importance of the competencies obtained during training in employment and professional activities. The set of competencies (professional and theoretical k1, professional and practical k2, information and communication k3, teamwork k4, leadership k5) for graduates of higher education institutions are constantly expanding today as labor market dictates new ones. At the same time, many competencies are of a general nature, inherent in any specialty and without which successful employment and career growth are impossible. Professional competencies should mainly be determined by employers, and universities should teach students the latest technologies, disseminate the world experience of the scientific community in technical innovations, information software products, etc.

The employer can assess if young specialist is trained enough to work in this company, enterprise, institution and if he can fulfill his professional duties. Quantitative assessment in this case will be subjective that is why only qualitative analysis is used.

The 3rd stage. The analysis of quantitative indicators of the labor market is carried out on the basis of a statistical analysis of the components of the labor market. In this study, based on statistical reporting, we use the following indicators:

- number of employed population aged 15 to 70 (*v1*);
- number of business entities (enterprises and individual entrepreneurs) (*v2*);
- number of students of higher education institutions (universities, colleges and lyceums) (*v3*);
- number of specialists graduated from higher education institutions (*v4*);
- number of persons admitted to higher education institutions (*v5*).

The 4th stage. Conducting a quantitative analysis of GDP (E) based on statistical reporting.

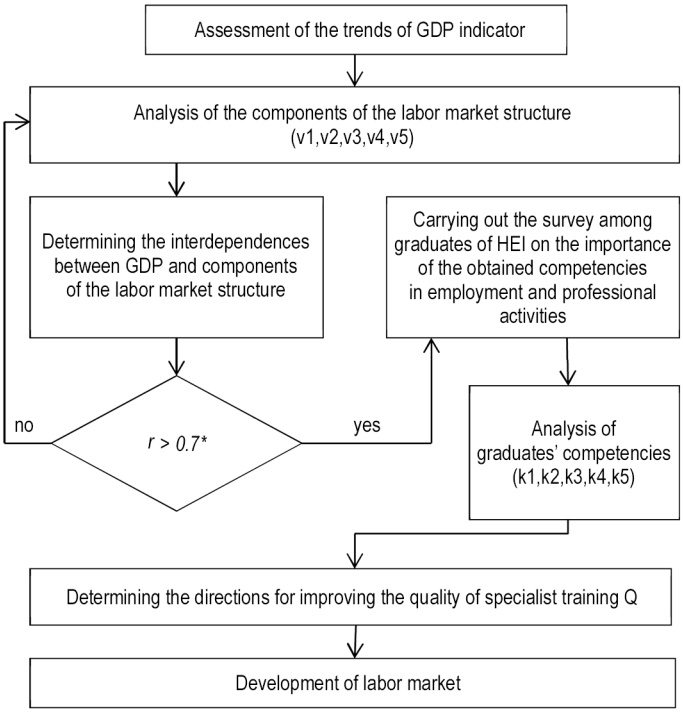
The dependence of each next stage on the previous one gives reasons to consider the change in GDP (E) as a function of the quality of specialist training (Q). Formula 1 is an economic and mathematical model of the dependence of GDP on the quality of training.

$$\begin{cases} E = f(v1, v2, v3, v4, v5) \\ v1, v2 = f(v3, v4, v5) \\ v4 = f(k1, k2, k3, k4, k5) \\ k1, k2, k3, k4, k5 = f(Q) \end{cases} \quad (1)$$

E – GDP, *v1* – number of employed population aged 15 to

70, *v2* – number of business entities, *v3* – number of students of higher education institutions, *v4* – number of specialists graduated from higher education institutions, *v5* – number of persons admitted to higher education institutions, *k1* – professional and theoretical competencies, *k2* – professional and practical competencies, *k3* – information and communication competencies, *k4* – teamwork competencies , k5 – leadership competencies, Q – quality of specialist training.

According to Figure 1 and Formula 1, a correlation and regression analysis between GDP and the components of the labor market structure was conducted. The use of correlation and regression analysis for building models of economic development was carried out by the authors (Ezekiel, M., & Fox, K. A., 1959; Montgomery, D. C. et al, 2012, Zakharkina, L. et al., 2018). The dependence between GDP trends and labor market indicators at the macro level was established. We believe that trends at the macro level are inherent in the trends at the micro level. This was confirmed by the dynamics of the decrease in the number of students in education institutions both at the national level and at the level of a particular educational programme. The survey was carried out among the graduates who studied by master's degree programme "Management of Organizations and Administration" of Sumy State University (SSU). We used the interviewing method for this purpose. The survey method, that was used in the works of authors (Wywiał, J., & Żądło, T., 2009; Abdiraiymova, G. et al, 2014; Pfeffer, F. 2012; Panigrahi, S. K., & Al-Nashash, H. M., 2019) was adapted to our study. The purpose of the survey is to determine to what extend the graduates' expectations about the prospects for using the acquired competencies for employment in the chosen specialty are met. It is the growth of employment indicators based on acquired competencies that confirms the quality of training. Figure 2 shows the algorithm for conducting study.



*Note: *)the Chaddok scale for assessment of stochastic relationships was used to estimate the tightness of relationships between the variables According to this scale: if r ≥ 0.7 – the relationship is tight*

Figure 2. Algorithm for conducting study

4. Results

The statistical data of Ukraine over the period 2011-2017 were used to determine the trends of GDP indicator and analyze the components of labor market structure. The values are given in Table 1.

Year	GDP, (mln USD) E	Employed population (thous. persons) v1	Number of business entities (including individual entrepreneurs) *(units)* v2	Number of students at education institutions (thous. persons) v3	Specialists graduated from education institutions, (thous. persons) v4	Admitted to education institutions (thous. persons) v5
2011	163160	20324.2	1701797	2721.0	866.6	661.3
2012	175781	19 261.4	1600304	2593.4	815	682.9
2013	183310	19 314.2	1722251	2443.9	803.6	667.1
2014	131805	18 073.3	1932325	2004.9	666.5	539.1
2015	90615	16 443.2	1974439	1909.4	612.4	499.7
2016	93270	16 276.9	1865631	1872.5	539.5	471.7
2017	112154	16156.4	1805144	1808	562.4	470.4

Table 1. Trends of GDP indicator and components of structure of labor market of Ukraine over the period 2011-2017

Source: Compiled by authors based on the data of State Statistics Service of Ukraine

The results were obtained based on the correlation and regression analysis (Table 2).

Studied dependence Y=f(X)	Results of correlation and regression analysis		
	Equations of pair linear regression	Linear correlation coefficient, r	Coefficient of determination, r^2
E=f(v1)	E= -237290+ 20,7v1	0.91	0.83
E=f(v2)	E=564565-0,2v2	0.82	0.67
E=f(v3)	E= -62887+ 90,5v3	0.88	0.78
E=f(v4)	E= -51212+268,9v4	0.91	0.84
E=f(v5)	E= -82874+ 383,3v5	0.95	0.91
V1=f(v4)	V1=9164+12,6v4	0.98	0.96
V2=f(v4)	V2= 2318635 -745,6v4	0.73	0.54
E=f(v1, v2, v3, v4,v5)	E=128739.5+0.1v1-0.1v2--163v3+110v4+351v5	0.99	0.99

Table 2. Results of the assessment of the interdependence between GDP and the components of structure of labor market of Ukraine over the period 2011-2017

The results of the analysis indicate the presence of a correlation relationship between the studied components. The correlation coefficient r is greater than 0.70 and are as close as possible to 1. This indicates that during the studied period there was a high degree of direct linear relationship between the studied components of the labor market structure and GDP. The coefficient of determination shows that the variation Y is caused by the variation X by 54-99% for the studied components. In case of an increase of graduates of education institutions in the number by 1%, an increase in employment is expected by 0.07% and GDP growth by 0.015% respectively.

Thus, GDP growth is connected with the development of the labor market. And in turn, the development of the labor market is influenced by the number of university graduates and the quality of their professional education that is reflected by the competencies acquired by them.

At the same time, during the study period, there is a general trend towards a decrease in the number of students both in Ukraine and universities in particular. As an example, let's analyze the quality characteristics of master's degree students in full-time form of training by programme "Management of Organizations and Administration" at Sumy State University. During the period 2011-2017 the graduates of the Department of Management amounted to 101 master's degree students (68 females and 33 males), including foreign students – 14 persons. The total average score of students over the period of seven years is 4.26 by a 5-point scale of assessing students' know-

Year	Number of students	Number of foreign students in a group	Nationality	Age (year of birth)	Academic performance (average score) by 5-point scale
2011	23	1	1-Tanzania	1976-1989	4.12
2012	18	1	1-Iraq	1981-1991	4.0
2013	15	-	Ukraine	1990-1991	4.18
2014	15	7	5-Turkmenistan 2- Nigeria	1984-1993	4.25
2015	9	3	2-Nigeria 1-Russia	1988-1993	4.46
2016	7	1	1-Zambia	1991-1994	4.39
2017	14	1	1-Nigeria	1992-1996	4.4

Table 3.
Ethnicity, age, average score over the period 2011-2017 of students, who studied by master's degree programme "Management of Organizations and Administration" of the Department of Management of Sumy State University

ledge. The total average age of a student studying by master's degree programme is 25.8 years.

Also, an analysis of graduate employment was conducted annually. The areas of employment of SSU graduates, who studied by master's degree programme "Management of Organizations and Administration" from 2011 to 2017in full-time form of training, were analyzed. The average employment rate by type of economic activity was determined (in percent) on the basis of the analysis. This indicator is shown in Table 4 compared with the employed population by economic activity in Sumy region and Ukraine in 2017. Such analysis allowed to determine the trends in the labor market and the demand for SSU graduates.

Figure 3 is based on the data of Table 4 and reflects the coincidence of employment trends by type of economic activity in Ukraine and Sumy region with the trends of employment of graduates who studied by master's degree programme "Management of Organizations and Administration" at SSU. The results of the analysis indicate the presence of a correlation relationship between studied components. The correlation coefficients r = 0.62. This indicates that during the studied period there was a moderate degree of direct linear relationship between the employment of SSU graduates and the employed population in Ukraine as a whole and in the Sumy region in particular. The coefficient of determination shows that the variation Y is due to the variation X by 38% by the studied components. Thus, specialist training by master's programme "Management of Organizations and Administration" corresponds to the trends of the labor market in Ukraine and Sumy region.

Employment by type of economic activity	Employment of SSU graduates who studied by master's degree programme "Management of Organizations and Administration" %, (Y)	Employed population by types of economic activity	
		in Sumy region in 2017, %, (x1)	in Ukraine in 2017, %, (x2)
Persons who continue their studying (postgraduate studies at SSU)	16	1.4	2.6
Private business (individual entrepreneurs)	17	12.5	14.4
Public administration authorities (administration, tax agency, department of statistics department of land management, etc.)	16	6.0	6.1
Trading sphere	13	20.1	21
Other, incl.	38	60.1	55.9
-industrial enterprises	13	14.7	15.1
-banking sphere	4	0.7	1.3
-advertising and publishing activity, hotel and tourism business, agriculture, etc.	21	44.6	39.5

Table 4. Priority areas of demand in the labor market for SSU graduates who studied by master's degree programme "Management of Organizations and Administration"

Source: Compiled by authors based on the results of carried out survey among graduates of SSU, who studied by master's degree programme "Management of Organizations and Administration" and data of State Statistics Service of Ukraine

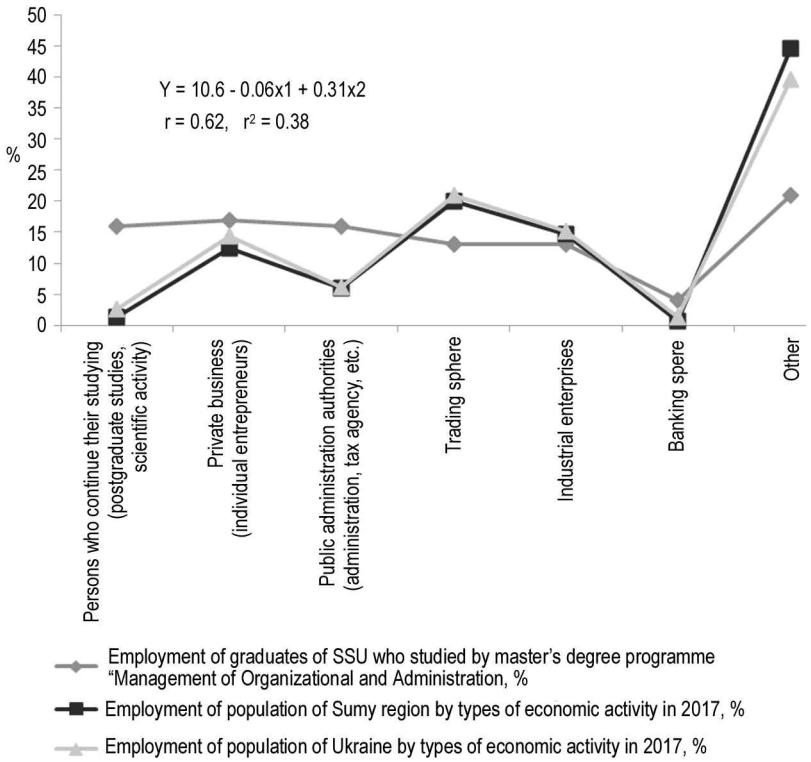


Figure 3.
Comparison of employment trends by types of economic activity in Ukraine and Sumy region with tends of employment of graduates who studied by master's degree programme "Management of Organizations and Administration" at SSU

In accordance with the areas of employment that were defined by the labor market for graduates of SSU who studied by master's degree programme "Management of Organizations and Administration" there is the necessity of analysis of competencies, the demand for which is the greatest during the studied period. For this purpose, in this study 5 groups of competencies were identified in accordance with the stated ones in the Draft of the Standard for Higher Education of Ukraine in the field of knowledge 073 Management for Level Two (Master) of higher education(2017) (table 5).

Group of competencies	General and Special (Professional)competencies
Professional and theoretical (k1)	General competencies: Ability to conduct research at the appropriate level Professional competencies: Ability to choose and use concepts, methods and tools of management, including in accordance with international standards Ability for self-development, lifelong learning and effective self-management The ability to plan and conduct research, prepare the results of scientific works for the publication
Professional and practical (k2)	General competencies: The ability to act on the basis of ethical considerations, socially responsible and consciously Professional competencies. Establishing criteria according to which the organization determines the future direction of development, develops and implements appropriate strategies and plans Ability to analyze and structure the problems of the organization, make managerial decisions and ensure the conditions for their implementation; Ability to manage the organization, its changes Knowledge of the basic modern provisions of the fundamental sciences regarding the origin, development and structure of the organization, the ability to use them to form an worldview position.
Information and communication (k3)	General competencies: The ability to communicate with representatives of various professional groups and within an international context; Skills of using information and communication technologies for searching, processing, analyzing information from various sources and decision making; Professional competencies. Ability to create and organize effective communications in the management process
Teamwork (k4)	General competencies: The ability to organize and motivate people towards a common goal, to work in a team Professional competencies: The ability to effectively use and develop human resources in the organization Ability to develop and manage projects, take initiative and show resourcefulness; Ability to use psychological technologies of work with personnel

Table 5. Groups of competencies by master's degree programme "Management of Organizations and Administration"

Source: Compiled by authors based on the Draft of the Standard for Higher Education of Ukraine in the field of knowledge 073 Management for Level Two (Master) of higher education (2017)

A survey was conducted among graduates who studied by master's degree programme "Management of Organizations and Administration" at SSU over the period from 2011 to 2017. The purpose of the survey was to determine the importance of the competencies they obtained during training for further employment and professional activities. We sent 90 questionnaires, and received 68 back. The overwhelming number of respondents believes that the competencies, which they obtained as a result of training, have influenced their successful employment. Also, the respondents assessed the separate influence of the basic competencies that they acquired while studying by master's programme for their successful employment. Respondents were asked to rate each competency on a 5-point scale. Figure 4 presents the relationship between the importance of competency for the respondent's employment field.

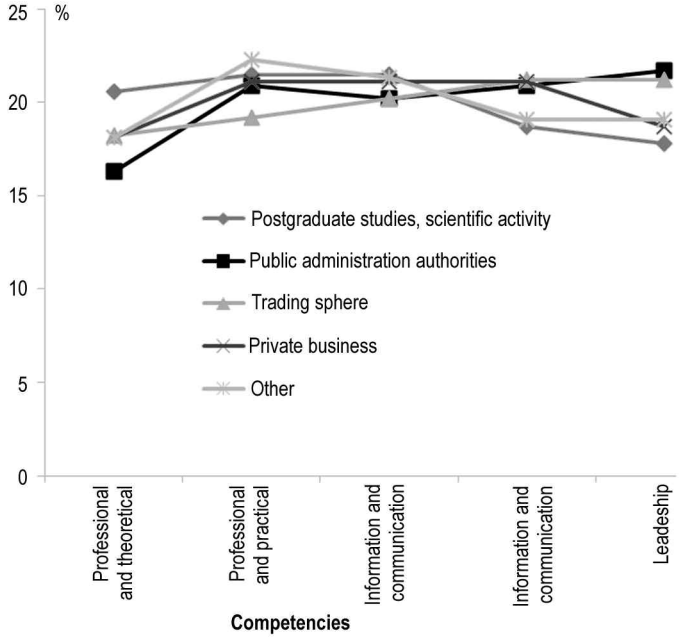


Figure 4. Importance of competencies for the field of respondent's employment (in percentage form).

The generalized results of the analysis are given in Table 6.

Indicator	Competencies				
	Professional and theoretical k1	Professional and practical k2	Information and communication k3	teamwork k4	leadership k5
Percentage value	18.5%	21.1%	21.0%	20.1%	19.3%

Table 6. Assessment of importance of obtained competencies in employment and professional activity of graduates who studied by master's degree programme "Management of Organizations and Administration".

Source: Compiled by authors based on the results of carried out survey among graduates who studied by master's degree programme "Management of Organizations and Administration" at SSU during the period from 2011 to 2017

In general, the questionnaires showed almost the same importance of the acquired competences in employment. Managers can work in various fields of activity, and their strong professional characteristics should be ensured by these competences.

Also, on the basis of the obtained questionnaire data, a correlation was established between the indicator of the quality of specialist training (Q) and the assessments of respondent's assessment of obtained competencies (*k1*, *k2*, *k3*, *k4*, *k5*). Thus, a hypothesis about the dependence of the quality of specialist training on the obtained competencies was proved (formula 1). For this purpose, a regression dependence was determined (formula 2) between the average score (Q), which the respondent received as a result of training at the university and the assessment of the importance of obtained competencies for him ($R = 0.71$, $r^2 = 0.51$).

$$Q = 1{,}19 + 0{,}200k1 + 0{,}196k2 + 0{,}335k3 - 0{,}003k4 + 0{,}001k5 \quad (2)$$

A comparison of the results obtained in Table 6 and formula 2 proves the following. The largest component in the formation of an overall assessment of Q (formula 2) is information and communication competencies k3 (coefficient 0.335), professional and theoretical k1 (coefficient 0.200) and professional and

practical k2 (coefficient 0.196). And according to the graduates' own assessment (table 6), the most significant competencies for them were professional and practical k2 (21.1% of respondents), information and communication k3 (21.0% of respondents) and teamwork k4 (20.1% of respondents).

5. Conclusions

The results of the analysis show that the largest correlation relationship is observed between the number of the employed population and GDP (r = 0.91). At the same time, the number of the employed population depends on the number of graduates of education institutions (r = 0.98). Modeling the interdependencies between GDP and the components of the labor market shows that in the conditions of Ukrainian economy, there is a relationship between the number of graduates of education institutions and social and economic development that indicates the necessity to find ways for improving employment rates. This is possible due to the condition of improving the quality of specialist training by determining the competencies required for the labor market.

The main qualitative characteristic of graduates of an education institution is an indicator of demand in the labor market. The analysis of the importance of competencies for the employment of graduates who studied by master's degree programme “Management of Organizations and Administration” proved the equal importance of each of five groups of competencies. According to the opinions of graduates, professional and practical competencies became the most important ones for employment (21.1% of respondents).

In general, the results of the study indicate the possibility of growth of quantitative indicators of social and economic development (GDP, labor market indicators, etc.) due to the improvement of quality indicators of specialist training on the basis of competency-based approach. This is possible through the improvement and revision of educational programmes in terms of professional and practical training of specialists.

Acknowledgement

The study was conducted within the frame work of the project “*Achieving and checking the alignment between academic programmes and qualification frameworks (543901-TEMPUS-1-2013-1-AM-TEMPUS-JPGR)*” and “*Corporate social and environmental responsibility for sustainable development: stakeholders' partnership in the real, financial and public sectors of the economy*” *(0117U003933)*.

References

[1] Aghion, P., Boustan, L., Hoxby, C., & Vandenbussche, J. (2009). The causal impact of education on economic growth: evidence from US. *Brookings papers on economic activity*, 1, 1-73.

[2] Abdiraiymova, G., Duisenova, S., & Shayakhmetov, S. (2014). Quality assessment of higher education in Kazakhstan (Based on sociological survey results). *Procedia-Social and Behavioral Sciences*, 116, 4315-4321.

[3] Bierne, J., Titko, J., Cerkovskis, E., & Lasmane, A. (2017, May). Advanced Teaching Methods for Students' Competencies Development. In *Proceedings of the International Scientific Conference*. Volume I (Vol. 63, p. 72).

[4] Bilan, Y., Vasilyeva, T., Lyulyov, O. & Pimonenko, T. (2019). EU vector of Ukraine development: Linking between macroeconomic stability and social progress. *International Journal of Business and Society*, 20(2), 433-450.

[5] Bilan, Y., Vasilyeva, T., Lyeonov, S. & Bagmet, K. (2019). Institutional complementarity for social and economic development. *Business: Theory and Practice*, 20, 103-115.

[6] Brookes, M., & Becket, N. (2007). Quality management in higher education: A review of international issues and practice. *International Journal of Quality Standards*, 1(1), 85-121.

[7] Butova, Y. (2015). The history of development of competency-based education. *European Scientific Journal, ESJ*, 11(10), pp. 250-255.

[8] Draft of the Standard for Higher Education of Ukraine in the field of knowledge 073 Management for Level Two (Master) of higher education (2017).

[9] European Association for Quality Assurance in Higher Education (ENQA). (2015). *Standards and guidelines for quality assurance in the European Higher Education Area (ESG)*. Brussels: ENQA.

[10] Ezekiel, M., & Fox, K. A. (1959). *Methods of correlation and regression analysis: linear and curvilinear*. Wiley, New York.

[11] Kanji, G. K., Malek, A., & Tambi, B. A. (1999). Total quality management in UK higher education institutions. *Total Quality Management*, 10(1), 129-153.

[12] Kim, J. O., & Mueller, C. W. (1978). *Factor analysis: Statistical methods and practical issues* (No. 14). Sage.

[13] Kobzev Kotásková, S., Procházka, P., Smutka, L., Maitah, M., Kuzmenko, E., Kopecká, M., & Hönig, V. (2018). The impact of education on economic growth: the case of India. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 66(1), 253-262.

[14] Kostyuchenko, N., Petrushenko, Y., Smolennikov, D. & Danko, Y. (2015). Community-based approach to local development as a basis for sustainable agriculture: Experience from Ukraine. *International Journal of Agricultural Resources, Governance and Ecology*, 11(2), 178-189.

[15] Kunanbayeva, S. S. (2016). Educational Paradigm: Implementation of the Competence-Based Approach to the Higher School System. *International Journal of Environmental and Science Education*, 11(18), 12699-12710.

[16] Law of Ukraine “On Higher Education” (2014).

[17] Law of Ukraine “On Education” (2017).

[18] Lyeonov, S. & Liuta, O. (2016). Actual problems of finance teaching in Ukraine in the post-crisis period. *The Financial Crisis: Implications for Research and Teaching*, 145-152.

[19] Mekovec, R., Aničić, K. P., & Arbanas, K. (2018). Developing Undergraduate IT Students' Generic Competencies through Problem-Based Learning. *TEM Journal*, 7(1), 193.

[20] Montgomery, D. C., Peck, E. A., & Vining, G. G. (2012). *Introduction to linear regression analysis* (Vol. 821). John Wiley & Sons.

[21] Panigrahi, S. K., & Al-Nashash, H. M. (2019). Quality Work Ethics and Job Satisfaction: An Empirical Analysis. *Quality-Access to Success*, 20(168), pp. 41-47.

[22] Pfeffer, F. (2012). Equality and quality in education. *Population Studies Center Research Report*, 774.

[23] Pryima, S., Dayong, Y., Anishenko, O., Petrushenko, Y. & Vorontsova, A. (2018). Lifelong learning progress monitoring as a tool for local development management. *Problems and Perspectives in Management*, 16(3), 1-13.

[24] Sallis, E. (2014). *Total quality management in education*. Routledge.

[25] Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics*, 70(1), 65-94.

[26] State Statistics Service of Ukraine (2017) Retrieved from https://ukrstat.org/uk/operativ/operativ2005/vvp/vvp_ric/svvpzkd_u.htm

[27] Telizhenko, O., Pavlenko, O., Martynets, V. & Rybalchenko, S. (2019). Modeling the influence of cluster components on the economic development of a territory. *TEM Journal*, 8(3), 900-907.

[28] Velde, C. (1999). An alternative conception of competence: implications for vocational education. *Journal of vocational education and training*, 51(3), 437-447.

[29] Wani, I. A., & Mehraj, H. K. (2014). Total quality management in education: An analysis. *International Journal of Humanities and Social Science Invention*, 3(6), 71-78.

[30] Wywiał, J., & Żądło, T. (Eds.). (2009). *Survey sampling in economic and social research*. University of Economics in Katowice Publisher.

[31] Zakharkina, L., Myroshnychenko, I., Smolennikov, D., & Pokhylko, S. (2018). Efficiency of Innovation Activity Funding as the Driver of the State's National Economic Security. *Montenegrin Journal of Economics*, 14(4), 159-173

[32] Zaytseva, T. (2016). The introduction of the competence-based approach in educational process of training of skippers. *ICT in Education, Research and Industrial Applications*.

Determinants and Consequences of Internal Auditor Quality on Regional Government Performance: An Empirical Investigation in Indonesia

Ewing Yuvisa IBRANI[1*], Faisal FAISAL[2], Neli SUKASARI[3], Yenny Dwi HANDAYANI[4]

[1]Ph.D Scholar, Diponegoro University, Semarang, Indonesia;
Accounting Department, Sultan Ageng Tirtayasa University, Banten, Indonesia
[2]Accounting Department, Diponegoro University, Semarang, Indonesia
[3]Inspectorate Auditor, Banten, Indonesia
[4]Accounting Department, Mercubuana University, Jakarta, Indonesia
* Corresponding Author: Ewing Yuvisa Ibrani; E-mail: ewing_ibrani@untirta.ac.id

Abstract

This study aims to determine the factors that may affect quality of audit and its impact on local government performance. Data are collected by distributing questionnaires to internal auditors in the inspectorate of Banten province – Indonesia. Using structural equation modeling (SEM) with SmartPLS 3.0 to test the proposed structural model, the results indicate that (1) internal auditor competence has a positive and significant effect on due professional care; (2) professional care and internal auditor competence have a positive and significant effect on quality of internal audit; and (3) quality of internal audit has a positive and significant effect on performance of local government.

Keywords: *competence of internal auditor; independence; due professional care; internal audit quality; local government performance.*

1. Introduction

Internal auditors have an important role to help management to achieve better organizational performance. Many pieces of research have been done related to the quality of internal auditor. However, it only focuses on various aspects of organization and carried out in the private sector. Onatuyeh & Aniefor (2013) investigated the role of effective internal auditing in public sector management and accountability in Nigeria. Although their research found that effective internal auditing can improve accountability, unfortunately, the size of the effectiveness of internal audits raises many desires because there were no prior reliability or testing instruments they reported.

A study of Ebimobowei & Kereotu (2011) in two southern Nigerian countries found that many government failures caused by internal audits to not carrying out their roles. Mustafa Baltaci and Serdar Yilmaz (2006) recognized the limited number of studies on internal auditing in the public sector, especially at local government level. Therefore, this study is important to do because of the phenomena that occur in the local government of Banten – Indonesia. According to *Badan Pemeriksa Keuangan* (BPK), the audit quality of the provincial inspectorate in Banten is considered still poor. This shows that the results of audits carried out by the local government internal control apparatus have not produced good audit quality. The low quality of the report can be caused by the lack of accounting financial information systems or lack of understanding of accounting from the compilers of the financial statements and the lack of competence of the human resources they possess.

The internal audit function provides added value for an organization because of its specific role in control, and risk management (Soh & Martinov-Bennie, 2011). Quality of internal audit is able to guarantee accountability in the public sector (Hay, Knechel, & Ling, 2008). The element of internal audit quality includes independence, competence, quality of work, training and development for internal audit (Reinstein, Lander, & Gavin, 1994).

Indonesian Auditing Standard Statement (SPAP, 2011) requires expertise and due professional care must be owned by the auditors. Due and careful professional care is an important requirement to be implemented in audit work. A good audit quality will be achieved if an auditor can comply with the basic requirements, where the auditor must have experience, competence, independence and due professional care in conducting an audit so that a financial report can be trusted.

2. Literature Review

2.1. Due Professional Care

Gallegos & Carlin (2004) state that due professional care can be defined in several ways. Some will show respect to the auditee and how the auditor treats himself during the audit process. Others believe that due professional care shows the hope of adding value to the auditee by providing solutions.

According to Cohen & Bailey (1997), the ability to recognize problems, curiosity, and professional skepticism is part of the concept of due professional care. Due professional care is something that can lead to audit quality (Nearon, 2005). Due professional care auditors must conduct an audit process with professional skepticism and adequate confidence, including completeness of working papers, audit evidence, and according to audit reports. In SPAP (2011) SA section 230, accuracy is required by auditors to carry out professional skepticism, namely

auditors attitude to think critically, always questioning and evaluating the audit evidence, and being careful in the duties. Nearon (2005) states that if the auditor fails to use skepticism, the audit opinion is ineffective and does not have good audit quality.

2.2. Quality of Internal Audit

DeAngelo (1981) states that audit quality as the probability that an auditor finds and reports about a violation in his/her client accounting system. An auditor who has audit duties in the government sector is required to have knowledge related to government administration. Audit quality in internal audit is basically the same as external audit (Gramling & Vandervelde, 2006).

For auditors, the quality of work seen from the audit quality produced is judged by how many auditors provide the correct response from each audit job completed (Tan & Kao, 1999). Davidson, Goodwin-Stewart, & Kent (2005) find that the presence of internal auditing can be associated with lower earnings management. Ege (2015) suggests that if managers have control over internal audit quality, opportunistic behavior can continue.

Otley & Pierce (1996) stated that audit quality is actually inherent in the auditor as the executor of the audit. Audit quality depends heavily on the judgment and integrity of the auditor itself. If the auditor has a high-quality and does his work professionally, he/she will produce quality output as well (Basuki, 2006).

2.3. Local Government Performance

Government RI Regulations No 58 (2005) clause 1 paragraph 45 states that performance is the outcome of activities that will or has been achieved in relation to the use of the budget with measurable quantity and quality. Performance measurement can be used as a basis for assessing the success and failure of the implementation of activities in accordance with the objectives set previously by the organization.

The performance of the public sector which is built from the paradigm of new public management has attracted the attention of researchers. Several measurement indicators have been developed (Pilcher, 2005). It is complicated to assess the performance of the public sector because the goals are directed to provide benefits for the citizens and stakeholders (Boschken, 1994).

Public sector organizations are influenced by rules and regulations that vary according to context and must be adhered to. Given the various stakeholders with different interests, some objectives that sometimes become uncertain and contradictory, assessing organizational performance in local government will depend on the objectives, the perspective being studied and what dimensions are focused (Walker, Damanpour, & Devece, 2010). Organizational performance in the public sector is often associated with the concepts of accountability, efficiency, effectiveness, fiscal health, income autonomy, customer satisfaction, fiscal strength, responsiveness, service quality, and financial performance (Carmeli & Tishler, 2004; Walker et al., 2010).

3. Hypothesis Development

3.1. Internal Auditor Competence and Due Professional Care

In internal audit, auditor competence is a very important aspect. The professional auditor skepticism influences auditor's knowledge in conducting audits and their impact on the process of allocating resources in audit planning (Nelson, 2009). According to (HM Treasury Audit Policy and Advice, 2001), due professional care is the use of audit skills and assessments based on experience, training (including continuing professional development), ability, integrity, and objectivity. The competencies possessed by an auditor will avoid the occurrence of carelessness to produce good audit quality.

Auditor with sufficient knowledge and experience can audit objectively and carefully. Audit quality is all possibilities where the auditor can find violations that occur in the accounting system and report them in auditing reports. Therefore, it can be understood that an auditor who has adequate knowledge and experience will understand and know various problems more deeply and easy to follow the development of the regulations. Thus,

H1: Internal auditor competency has a positive effect on due professional care

3.2. Independence of Internal Auditor and Due Professional Care

Independence is the attitude expected of an accountant not to have a personal interest in carrying out his/her duties that are contrary to the principles of integrity and objectivity. Alim & Hapsari (2007) find that independence has a significant effect on professional auditor judgment. The auditor must be able to collect any information needed to make audit decisions supported by independence attitude.

According to Umar & Anandarajan (2004), auditor perceived independence is very important to maintain public trust in the audit profession. The independent attitude will be supported by the application of accuracy which realized by conducting a critical review at each level of supervision of the audit implementation. When the auditor has independence, the auditor is almost professional to conduct the audit process and care in the examination using professional judgment (Fischbacher & Stefani, 2007). Thus,

H2: Independence of internal auditors has a positive effect on due professional care

3.3. Due Professional Care and Audit Quality

Due professional care means careful and thorough professional skills. According to PSA No. 4 (SPAP, 2011), accuracy in the use of professional skills requires auditors to carry out professional skepticism, namely an attitude of auditors to think critically by always questioning and evaluating the audit evidence. Auditors who fail to apply skepticism will produce audit opinions that are inefficient and do not have good audit quality (Mansur, 2007). Careful and thorough use of professional skills allows the auditor to obtain reasonable assurance that the financial statements are free from material misstatement which caused by errors or fraud. Hidayat (2015) tested due professional care on audit quality found that due professional care had a significant effect on audit quality. Professional skills and adequate confidence greatly assist the auditor to determine the scope and methodology of carrying out audit work.

Boon, Mckinnon, & Ross (2008) state that due professional care is one of the important aspects to measure audit quality. Because audit evidence is collected and assessed during the audit process, professional skepticism must be used throughout the process. Errors can be detected if the auditor has expertise and accuracy.

Professional accuracy of an auditor to conduct an examination will affect the quality of the examination results. The auditor must use his/her professional skills carefully in each assignment. Due professional care can be applied in professional considerations (Iskandar, 2014). Thus,

H3: Due professional care has a positive effect on audit quality

3.4. Internal Auditor Competency and Audit Quality

Boon et al. (2008) state that auditor competence important to measure audit quality. Internal auditor competence is a piece of

knowledge, expertise, and skill of an internal auditor that is required to audit objectively, carefully and thoroughly. Auditors who are highly educated will have a broader view of things. The auditor will increase a lot of knowledge about the field to find out various problems in more depth. Tubbs (1992) notes that auditors have advantages in terms of (1) detecting errors, (2) understanding errors accurately, (3) finding the cause of errors. The more experienced auditors, they are increasingly sensitive to mistakes.

Dityatama (2015) shows that there is a positive influence between internal auditor competence and audit quality. This is in line with the study of Alim & Hapsari (2007) found that an auditor who has sufficient knowledge, expertise, experience, and skills will better understand various problems in a deeper and easier to keep up with increasingly complex developments in the audit environment. Thus,

H4: Internal auditor competence has a positive effect on audit quality

3.5. Internal Auditor Independence and Audit Quality

Independence means not easily influenced, because the auditor carries out his/her work for the public interest. The auditor is not justified by someone interests. Independence is an auditing standard that is very important to be owned by the auditor. The auditor must be able to maintain an independent attitude because of the opinion he/she issued aims to increase the credibility of the financial statements presented by management. Research conducted by (Harhinto, 2004; Alim & Hapsari, 2007) shows that independence has a significant effect on audit quality reported by auditors to clients.

According to Halim & Abdullah (2006), the factors that influence audit quality are auditor compliance with the code of ethics which is reflected by the attitude of independence, objectivity, and integrity. Mulyadi (2014) states that independence is a mental attitude that is free from influence, not controlled by other parties. A number of researches show that independence factor is an important role for the auditor to carry out his/her profession. Thus,

H5: Independence of internal auditor has a positive effect on audit quality

3.6. Quality of Internal Audit and Local Government Performance

The quality of work is related to how well a job is completed compared to the criteria have been set. Work quality of auditors is seen from the audit produced which is judged by how many auditors provide the correct response to audit completed (Tan & Kao, 1999).

Quality of internal audit can reduce fraud risk, increase control levels, external monitoring costs become lighter, avoid earnings management, and minimize other opportunistic behavior in an organization (Ege, 2015; Prawitt et al., 2009). In another study, Prawitt et al. (2009) suggest that internal audit quality can help minimize opportunistic behavior and reduce earnings management in organization. Thus,

H6: Quality of internal audit has a positive effect on performance of regional government

3.7. Due Professional Care, Competency and Independence of Internal Auditor, and Audit Quality

Mihret & Yismaw (2007) stated that good audit quality can be achieved by implementing an audit plan to identify the objectives, scope of audit, and what procedures used by auditor competencies. Competencies possessed by an auditor are supported by conducting prudent audits and equality to avoid the occurrence of carelessness and to produce good audit quality.

Mautz & Sharaf (1961) cites Carman's opinion regarding the importance of independence as follows "if an auditor's benefit is damaged by feelings in some third parties who doubt his/her independence, he/she is responsible not only for maintaining independence in reality but also avoiding possible appearances". Community assessment of the independent auditors is not on the auditor as a whole. If an independent auditor fails to maintain his/her independence, it is likely that public perception is not independent. Such suspicion can lose credibility on the audit services of independent auditors.

Due professional care is the auditor has to achieve a good audit quality. It depends on certain conditions, such as a close relationship with the client, provision of goods or services, education level, experience, and training of an auditor. Attitude, behavior and learning theory clarifies the independent attitude of auditors.

Independent attitude of the auditor will be supported by the application of accuracy which is realized by conducting a critical review to each supervision level of the audit implementation. The auditor independence is supported by the accuracy to produce better audit quality, in which every opinion given by the auditor has followed the guidelines stated in the auditing standards (Hardiningsih, 2010). Thus,

H7: Due professional care mediates the relationship between internal auditor competence and audit quality

H8: Due professional care mediates the relationship between internal auditor independence and audit quality

4. Research Methods

4.1. Sample

This study applies a survey in Banten provincial government inspectorate. The sample is determined using saturated sampling which the entire population supposed as an observation unit.

4.2. Measurement

Competence is measured using 3 indicators (i.e., educational qualification, professional certification, and professional experience from internal audit staff). *Independence* is measured using 8 indicators (i.e., level of independence, level of reporting, direct contact with the board and senior management, conflict of interest, interference, unlimited access to all departments and employees, appointment and dismissal of the head of internal audit, and performance of non-audit activities. *Due professional* care is measured using 2 indicators (i.e., professional skepticism and adequate belief. *Internal audit quality* is measured using 3 indicators (i.e., audit planning, audit testing, and audit reporting. *Local government performance* is measured using 10 indicators (i.e., accountability, efficiency, effectiveness, fiscal health, fiscal strength, income autonomy, service quality, customer satisfaction, responsiveness, and financial performance

4.3. Data analysis

Data in this study are obtained through questionnaires and analyze using the SmartPLS 3.0 version. Partial least square (PLS) is a structural equation model (SEM) based on component or variance. PLS is a powerful analytical method (Wold, 1985) because it is not based on many variations.

5. Results and Discussion

In this study, 75 questionnaires were distributed to Banten province inspectorate auditors. The questionnaires returned were 67. The detail respondents at each level of functional positions that have filled out the questionnaire as presented in Table 1.

Functional Position	Number
Middle auditor	1
Young auditor	17
First auditor	37
Implementing auditor	1
Middle government supervisor	1
Youth administration	5
First government supervisor	4
Inspector	1

Table 1. Functional Position of Respondents
Source: Own calculations

Variable	Min	Max	Mean	SD
Competence	9	15	13.2537	1.49081
Independence	22	38	28.8955	2.98549
Due Prof Care	15	25	22.16	2.403
Audit Quality	16	25	22.18	2.201
Loc_Gov Performance	33	50	44.33	4.9
(N=67)				

Table 2. Descriptive Statistics
Source: Own calculations

Table 2 shows a score range between 22 to 38 SD values of 2.98 with an average of 28.89. It indicates that the respondent's answer related to independence shows a large standard deviation. Due professional care, quality of AI and performance respectively have shown good results which the answers of the average tend to approach the maximum score and the standard deviation value (2.40, 2.20 and 4.90). It means that almost the entire the respondent's answer agrees that due professional care, AI quality and Loc_Gov performance are very similar to the question items.

Table 3 explains that AVE value is above 0.7. This shows that the model has a good discriminant validity from each indicator used to determine the influence of competence, independence, due professional care, internal audit quality, and the local government performance. Table 3 also 3 shows that each construct or latent variable has composite reliability value is above 0.8 which indicates that the internal consistency of the variables.

In Tabel 3, the value of Adjusted *R-square* of due professional care is 0.751, quality of internal audit is 0.777, and local government performance is 0.776. The higher *R-square* means that the greater independent variable explains the dependent variable.

Testing the inner model or structural models made to look at the relationship between the constructs, the significant value, and R-Square of the research model. The limit to reject and accept the proposed hypothesis is ± 1.96. The inner model in this study can be seen in Table 4.

	Cronbach Alpha	Composite Reliability	AVE		
DPC	0.897	0.923	0.709		
Independence	0.865	0.892	0.736		
Loc_Gov Performance	0.967	0.972	0.794		
Competence	0.835	0.903	0.759		
Audit Quality	0.868	0.91	0.716		
	DPC	Independency	Loc_Gov Performance	Competency	AI Quality
DPC	0.842				
Independence	0.133	0.858			
Loc_Gov Performance	0.958	0.077	0.891		
Competence	0.866	0.048	0.913	0.871	
Audit Quality	0.839	0.203	0.883	0.856	0.846
R-Square	0.758		0.78		0.787
R-Square Adjusted	0.751		0.776		0.777

Table 3.
Reliability and Validity
Source:
Own calculations

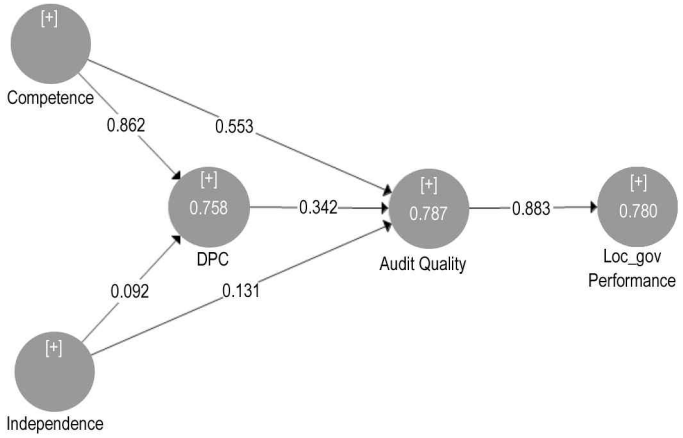


Figure 1. Research Framework

	Original sample estimate	Mean	SD	t-value	p-value
DPC → Audit Quality	0.342	0.375	0.155	2.216	0.027
Independence → DPC	0.092	0.081	0.068	1.345	0.179
Independence → Audit Quality	0.131	0.132	0.076	1.731	0.084
Competence → DPC	0.862	0.869	0.033	26.154	0.000
Competence → Audit Quality	0.553	0.514	0.172	3.213	0.001
Audit Quality → Loc_Gov Performance	0.883	0.886	0.03	29.46	0.000
Independence → DPC → Audit Quality	0.031	0.028	0.028	1.121	0.263
Competence → DPC → Audit Quality	0.295	0.326	0.134	2.198	0.028

Table 4. Result of Hypotheses Testing
Source: Own calculations

Table 4 shows the original estimate of competence on DPC is positive at 0.862 and significant with the value of t-statistics (26.154 > 1.96); INDP on DPC is positive at 0.092 and not significant with the value of t-statistic (1.345 < 1.96); DPC on quality of internal auditor is positive at 0.342 and significant with the value of t-statistic (2.216 > 1.96); AI competency on AI

quality is positive 0.553 and significant with the value of t-statistic (3.213 > 1.96); IA independence on AI quality is positive 0.131 and significant with the value of t-statistic (1.731 < 1.96); AI quality on local government performance is positive at 0.883 and significant with the value of t-statistic (29.460 > 1.96).

This study obtained empirical evidence that there was a significant positive effect of internal auditor competency on due professional care. The higher competence of an auditor, the higher creation of due professional care in the audit process to minimize the emergence of conflicts of interest so that the auditor's professional values can be maintained. This finding supports the previous study conducted by Dityatama (2015).

Internal auditor competency is a qualification needed by the auditor to audit properly. In conducting an audit, the auditor must have good personal quality, adequate knowledge, and special expertise. Whereas due professional care is accuracy and precision in the use of professional skills required to carry out skepticism professional, namely attitude of auditors who think critically by questioning and evaluating the audit evidence. So, the higher competence of an auditor, the higher creation of due professional care in the audit process.

This study revealed that there is no influence between independence of internal auditor on due professional care. It indicated the difficulty of placing an independent position for internal auditors, especially in Banten provincial inspectorate. This is due to the position of the internal auditor who also greatly affected by the leadership orders. The results of the study are in line with Sari (2015) which states that auditors with a service period of fewer than 3 years tend to produce answers that are less positive.

An auditor who has sufficient knowledge and expertise will better understand various problems and easier to keep up with increasingly complex developments in the audit environment. Audit quality is expected to achieve corporate governance and clean governance. Low competency will also lead to failure in audits because auditors will find difficult regarding irregularities. Internal auditor competencies can also determine the success of the audit.

The influence of quality of internal audit work on performance of the regional government shows that implementation of the principles of good governance will contribute to the improvement of social welfare, increasing bargaining power for investors and preventing fraudulent use of the regional budget. Good government financial management must be supported by quality public sector audits. If the quality of public sector audits is low, the possibility of providing concessions to government agencies is deviating from budget use.

The results of this study indicate that the existence of competencies possessed by an auditor, supported by conducting a careful audit and accuracy will avoid the occurrence of carelessness to produce good audit quality. A good audit quality can be achieved by implementing an audit plan by identifying the objectives, scope of the audit, and what procedures will be used by using the competence of an auditor.

6. Conclusion

This study concludes that competency and due professional care improve internal audit quality. The limitation of this study is less of technical knowledge among auditors which led to any fundamental deficiencies. These deficiencies include unscientific language use and a number of other shortcomings.

Based on the results, the authors intend to provide suggestions that can be used for all parties. *First*, in conducting audits, the auditor should be good personal quality, adequate knowledge, and special expertise in the fields. Therefore, internal auditors must be placed in situations and conditions to make it possible to carry out the duties properly. *Second*, the attitude of auditor independence can avoid relationships that might interfere with the auditor's objectivity. The higher the auditor maintains its independence, the higher the creation of due professional care will be. Third, auditing should professional scientist and sufficient confidence. The use of professional skills carefully allows the auditor to obtain reasonable assurance to avoid errors or fraud.

References

[1] Basuki, K. Y. M. (2006). Effect of Time Budget Pressure on auditor dysfunctional behavior and audit quality in public accounting firms in Surabaya. *Manajemen, Akuntansi Dan Sistem Informasi*.

[2] Boon, K., Mckinnon, J., & Ross, P. (2008). Audit service quality in compulsory audit tendering: Preparer perceptions and satisfaction. *Accounting Research Journal*, vol. 21(2): 93-122.

[3] Boschken, H. L. (1994). Organizational Performance and Multiple Constituencies. *Public Administration Review*, 54(3): 308–312.

[4] Carmeli, A. & Tishler, A. (2004). The relationships between intangible organizational elements and organizational performance. *Strategic management journal*, 25(13): 1257–1278.

[5] Cohen, S. G., & Bailey, D. E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management*, Vol. 23, issue 3, pp. 239-290.

[6] Davidson, R., Goodwin-Stewart, J., & Kent, P. (2005). Internal governance structures and earnings management. *Accounting and Finance*, 45(2): 241–267.

[7] DeAngelo, L. E. (1981). Auditor size and audit quality. *Journal of Accounting and Economics*, 3(3): 183–199.

[8] Dityatama. (2015). The influence of internal auditor's competency and independency to the internal auditor ' s due professional care and the implication to the internal audit quality. *Research Journal of Finance and Accounting*, 6(6): 179–190.

[9] Ebimobowei, A., & Kereotu, O. J. (2011). Role theory and the concept of audit expectation gap in South-South, Nigeria. *Current Research Journal of Social Sciences*, 3(6): 445–452.

[10] Ege, M. S. (2015). Does internal audit function quality deter management misconduct? *Accounting Review*, 90(2): 495–527.

[11] Fischbacher, U., & Stefani, U. (2007). Strategic errors and audit quality: An experimental investigation. *Accounting Review*, 82(3): 679–704.

[12] Gallegos, F., & Carlin, A. (2004). Best practices in due professional care: An IT audit perspective. *Edpacs*, 31(8): 1–13.

[13] Goverment republic indonesia regulations No 58. (2015). n.d *Regional financial management*.

[14] Gramling, A. & Vandervelde, S. D. (2006). Assessing Internal Audit Quality. *Internal Auditing*, 21(3): 26-30.

[15] Halim, Abdul; Abdullah, S. (2006). Relations and Agency Issues in Local Government: A Budget and Accounting Research opportunity. *Jurnal Akuntansi Pemerintah*, 2: 53–64.

[16] Hardiningsih, P. (2010). Effect of Independence, Corporate Governance, and Audit Quality on the Integrity of Financial Statements. *Jurnal Kajian Akuntansi*, 2(1): 61–76.

[17] Harhinto, T. (2004). *The Influence of Expertise and Independence to Audit Quality Empirical Studies on KAP in East Java*. Diponegoro.

[18] Hay, D., Knechel, W. R., & Ling, H. (2008). Evidence on the Impact of Internal Control and Corporate Governance on Audit Fees. *Ssrn*, 24: 9–24.

[19] Hidayat, R. (2015). Effect of regional financial management and regional financial accounting systems on the performance of local governments. *Ejournal.Unp.Ac.Id*, 1–27.
[20] HM Treasury Audit Policy and Advice (2001). *Advice, Definition of Internal Audit and Standards for the Professional Practice of Internal Audit in Government Organizations*.
[21] Iskandar, M. (2014). Interaction of Independence, Experience, Knowledge, Due Professional Care, Accountability and Job Satisfaction on Audit Quality. *3rd Economics & Business Research Festival*, XVIII(2): 1–15.
[22] M. Nizarul Alim, Trisni Hapsari, L. P. (2007). Effect of Competence and Independence on Audit Quality with Auditor Ethics as Moderation Variables. *Simposium Nasional Akuntansi 10*, 53(9): 1–26.
[23] Mansur, T. (2007). *Factors affecting audit quality are viewed from the auditor's perception of independence training and expertise and the use of professional skills*. Gadjah Mada University.
[24] Mautz, R. K., & Sharaf, H. A. (1961). *The philosophy of auditing*. American Accounting Association.
[25] Mihret, D. G., & Yismaw, A. W. (2007). Internal audit effectiveness: An Ethiopian public sector case study. *Managerial Auditing Journal*, 22(5): 470–484.
[26] Mulyadi. (2014). *Auditing*. Salemba Empat.
[27] Mustafa Baltaci and Serdar Yilmaz. (2006). Keeping An Eye On Subnational Governments: Internal Control And Audit At Local Levels. *The International Bank for Reconstruction and Development*, 30(5): 6.
[28] Nearon, B. H. (2005). Foundations in auditing and digital evidence. *CPA journal*, 75(1): 32.
[29] Nelson, M. (2009). A model and literature review of professional skepticism in auditing. *Auditing: A Journal of Practice & Theory*, 28(2): 1–34.
[30] Onatuyeh, E. a., & Aniefor, S. J. (2013). Impact of effective internal audit functions on public sector management and accountability in Edo State, Nigeria. *International Journal of Economic Development Research and Investment*, 4(3): 91–103.
[31] Otley, D. T., & Pierce, B. J. (1996). Auditor time budget pressure: Consequences and antecedents. *Accounting, Auditing & Accountability Journal*, 9(1): 31–58.
[32] Pilcher, R. (2005). Local government financial key performance indicators - Not so relevant, reliable and accountable. *International Journal of Productivity and Performance Management*, 54(5–6): 451–467.
[33] Prawitt, D. F., Smith, J. L., & Wood, D. A. (2009). Internal Audit Quality and Earnings Management. *The Accounting Review*, 84(4): 1255–1280.
[34] Reinstein, A., Lander, G. H., & Gavin, T. A. (1994). The external auditor ' s consideration of the internal audit function. *Managerial Auditing Journal*, 9(7): 29–36.
[35] Sari, E. N. (2015). *Effect of Competence, Independence and Due Professional Care on Audit Quality* (*Empirical Studies in Public Accountants in Jakarta and Tangerang*).
[36] SPAP. (2011). Standar Profesional Akuntan Publik. *IAPI*. http://iapi.or.id/detail/63-spap.
[37] Tan, H. T. & Kao, A. (1999). Accountability effects on auditors performance: Influence of knowledge, problem-solving ability, and task complexity. *Electronic journal*, 37.
[38] Tubbs, R. M. (1992). The on Effect of Experience Organization Knowledge the and Auditor ' s Amount. *Accounting Review*, 67(4): 783–801.
[39] Umar, A., & Anandarajan, A. (2004). Dimensions of pressures faced by auditors and its impact on auditors' independence: A comparative study of the USA and Australia. *Managerial Auditing Journal*, 19(1): 99–116.
[40] Walker, R. M., Damanpour, F., & Devece, C. A. (2010). Management innovation and organizational performance: The mediating effect of performance management. *Journal of Public Administration Research and Theory*, 21(2): 367–386.
[41] Wold, H. (1985). Partial least squares. *Encyclopedia of Statistical Sciences*, (2): 581–591.

Logistics Audit in Large Scale Retail Companies

Zdzisław JEDYNAK

Assistant Professor, PhD, Rzeszow University of Technology, Faculty of Management,
Department of Management Systems and Logistics, Rzeszow, Poland; E-mail: zjedynak@prz.edu.pl

Abstract

Logistics plays a very important role in large scale retail companies. It is worth noting that the vast part of activities performed by individual employees in those entities, at different levels of management, are typical logistic tasks. Logistics has an ancillary function, which means that it supports the sales process. However, logistic tasks performed are dispersed and most often are not coordinated within the whole enterprise, but only at the level of a given sector or department, while the decision-making process is usually decentralised.
The analysis of literature indicates the lack of general and detailed studies regarding the concept and structure of relevant organisations as well as characteristics of the performed logistic processes. The presented contents do not comprise the subjective, objective or functional specificity of retail.
This paper aims at systematisation and extending the knowledge concerning the structure and course of warehousing in large scale retail companies. The study will allow to explain the course of the warehousing process in the analysed companies, by defining its purpose, stages and tasks, assessment criteria, used documents and also persons in charge and those responsible for particular activities. The research method used in the study was observation. The technique of the study was observation of own management and organisational activity.

Keywords: *control; system, logistics; distribution; warehouse; stock.*

1. Introduction

Large scale companies are one of the most significant entities on the retail market. They are business entities located in large and medium cities and their closest vicinity, specialised in sales of goods to end customers. Their commercial offer, exposed on a large area, includes a wide selection of products and limited selection of auxiliary services. Most often they are members of a retail chain.

Logistics plays a very important role in large scale retail companies. It is worth noting that the vast part of activities performed by individual employees in those entities, at different levels of management, are typical logistic tasks. Logistics has an ancillary function, which means that it supports the sales process. However, logistic tasks performed are dispersed and most often are not coordinated within the whole enterprise, but only at the level of a given sector or department, while the decision-making process is usually decentralised. In this regard, a strong need to provide systemic solutions in logistic management has become apparent. The actions taken must lead to determining the methods and tools that could be used for targeting, optimising and maintaining the logistic processes. One of the possible methods is the logistics audit. This term refers to an independent and objective process of control and consulting, carried out regularly in the logistic system of a given organisational unit (Markham 1999, p. 20). It is an internal audit, with a non-financial and operating character (O'Regan D., 2003, p. 23).

The analysis of literature indicates the lack of general and detailed studies regarding the concept and structure of relevant organisations as well as characteristics of the performed logistic processes. The presented contents do not comprise the subjective, objective or functional specificity of retail. Consequently, the purpose of this paper is to systematise and extend the knowledge concerning the logistics audit in large scale retail companies. These efforts lead to providing an answer to the question of how should be the logistics audit procedure prepared and conducted in a large scale retail company. This question, that is the essence of the research subject, may be divided into specific questions regarding the aim of the logistics audit, its stages, tasks, methods and tools, assessment criteria, relevant documents, persons in charge and executive personnel, as well as the rules to be followed. The assumed goal will be fulfilled by means of: assessment the current knowledge on preparing and conducting the operating audit; assessment of the decision-making situation in large scale retail companies; determining the assumptions and rules of logistics audit in the analysed enterprises. The chosen research method was observation. The technique of the study was observation of own management and organisational activity. The study encompassed four popular trade networks operating in Poland. One of these entities was a household supermarkets network, while the others were food retail chains. Considering the uniform operating rules of individual trade units of a given chain, it has been assumed that the research would concern only selected supermarkets.

2. Theoretical Grounds for the Operating Audit

In the literature on the subject, the concept of audit is defined as a set of purposeful and systematic activities carried out in a given organisational unit by independent specialists, and their major goal is to maintain the current situation and/or introducing an additional value (Dryl 2010, p. 89). Assuming the subject criterion, audits are classified as external or internal. An internal audit comprises all control and advisory activities conducted as part of a selected organisational unit, in a comprehensive manner, or regarding specific functional or operating areas

(Kizukiewicz 2013, p. 17). Further division allows to distinguish financial or non-financial audits. The types of non-financial audits include the audit of activity, operating audit, compliance audit, IT audit and internal control review. The operating audit involves an assessment and correction of actions in terms of effectiveness and efficiency of use of manufacturing resources available in a given organisational unit (Winiarska 2005, p. 26).

In the subject literature, operating audit is usually a two-phase procedure, encompassing control and advice (Lisiński 2011, p. 200). A different division distinguishes the preliminary phase (related with planning), main phase (comprising executive activities) and the final phase (advisory activities) (Kizukiewicz 2013, p. 19). Individual phases further divide into stages and tasks to be performed.

The preparation and conducting an operating audit requires involvement of appropriate employees. Most often two groups of employees are distinguished (control and executive personnel). According to this division, the following positions can be specified: lead auditor (in charge our the entire process), stage auditor (responsible for individual audit stages) and task auditor (executes audit tasks) (Jedynak 2017, p. 97).

Another important issue in development of the operating audit procedure is the selection of proper methods, tools and assessment criteria. The subject literature lists a number of available methods. Most popular among them are direct interview, observation, indicative assessment and expert method (Jedynak 2017, p. 99). The criteria used for assessment of a given organisational unit usually include: legality, economy, purposefulness, reliability, transparency and openness ([Dryl 2010, p. 93). The accepted criteria must be defined at a later stage, e.g. by determining relevant parameters, degree of significance and the method of evaluation.

Significant support, both at the stage of preparation and the execution of the operating audit is provided by documents that are already available and drawn up in the course of the procedure. They facilitate planning, data collection, processing and presentation. Additionally, they allow to control the progress of individual audit stages and tasks, and are also used for supervision and assessment of the auditor's job (Grocholski 2004, p. 45). While preparing the operating audit documentation, it is crucial to ensure they are purposeful, useful, clear and guarantee positive relation between the cost and effect (Jedynak 2017, p. 122).

3. Decision-Making Situation in Enterprises

The logistic system of large size retail companies is an artificial, technical and social system of space and time transformation. Its main purpose is to ensure optimum flow of logistic streams both in the enterprise and in the entire supply chain. Considering these qualities as well as the subject and purpose of this paper, the described system shall be analysed in three aspects: objective, subjective and functional.

In the objective approach, the logistic system of a large scale retail company is made of a network of related and cooperating functional and task divisions and the human. Its subjective scope, considering the organisational structure of the company, comprises the goods acceptance and release department, commercial department and customer service department. In these departments, three groups of employees involved in the fulfilment of logistic processes can be distinguished, i.e. managerial staff/management, supporting staff (supporting the higher level personnel, with limited independence) and ordinary workers (performing particular tasks). Additionally, supporting workers, assisting in logistic tasks, perform a very important role. This group includes: OHS specialist, technical department employees, security staff, cleaning personnel, employees of human resources, finances and accounting departments.

An example of the organisational structure in a large scale retail company is presented in Figure 1.

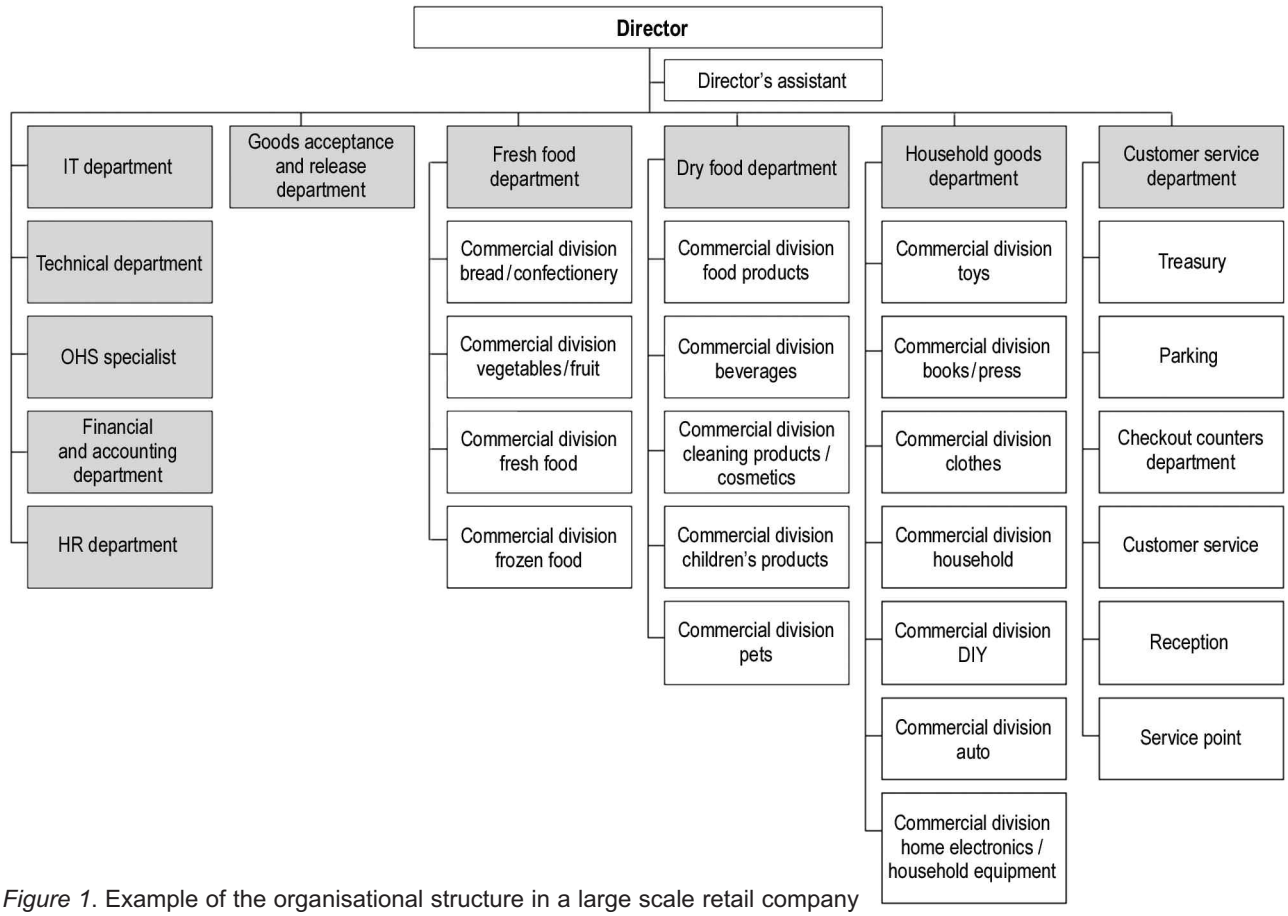


Figure 1. Example of the organisational structure in a large scale retail company

Source: individual study

In the substantial approach, the logistic system of a large scale retail company is defined on the basis of the available production measures. These include both the work subject and the operating resources.

The subject of work are the goods included in the commercial offer of the analysed company. Based on the type of goods, basic item categories can be distinguished. Further division is based on special purposes, i.e. subgroups or subclasses. It is worth noting that goods classification chosen by the analysed companies reflects their pattern of organisation and management. It means that the sales area and warehouse are divided into zones. In every zone, particular goods are placed, grouped by the type and handled by a specific commercial department (specialisation). An example of the area structure in a large scale retail company is presented in Figure 2.

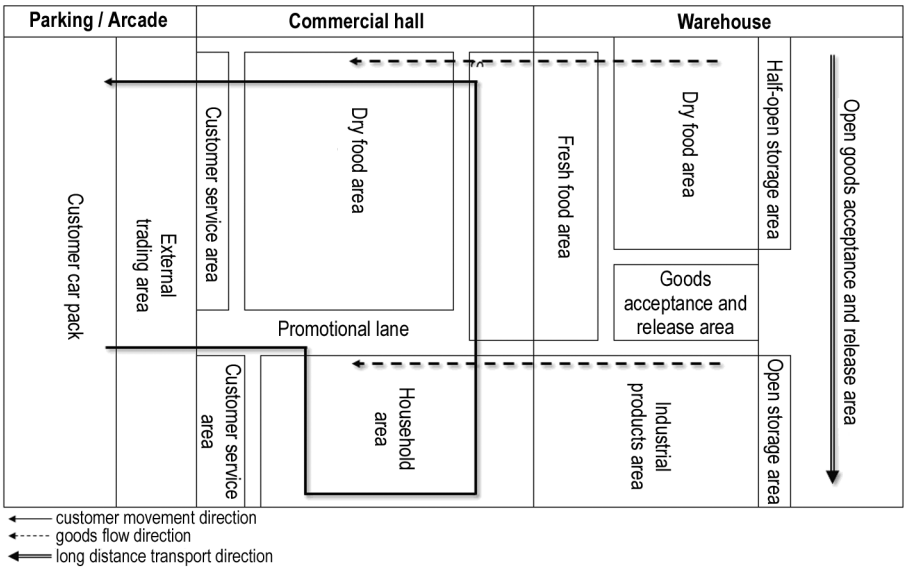


Figure 2.
Example of the area structure in a large scale retail company

Source: individual study

Operating resources in the analysed companies are divided into two groups: logistic infrastructure and materials used in its operation. The logistic infrastructure includes buildings and structures, along with technical equipment that belongs to them. In large scale retail companies, closed structures constitute an important part of the building arrangement. Additionally, trading units use a parking area, shopping arcade, semi-open warehouse and open warehouse with paved surface. The technical equipment includes warehouse and shop devices, transport and handling facilities, auxiliary equipment and IT system. The scope of application of individual technical devices in a large scale retail company is presented in Table 1.

Technical equipment		Warehouse		Commercial hall	
		Goods acceptance and release area	Storage area	Commercial area	Customer service area
Warehouse and shop equipment	for storage purposes		■■■	■■■	■
	HVAC		■■■	■■■	
	fire protection	■■■	■■■	■■■	■■■
	safeguarding	■■■	■■■	■■■	■■■
Transport and handling equipment	manually operated trolleys	■■■	■■■	■■■	
	hoisting trucks	■■	■■■	■■■	
	forklifts	■■	■■■		
Auxiliary equipment		■■■	■■■	■■■	
IT systems		■■■	■	■	■■■

Table 1.
Scope of application of individual technical devices in a large scale retail company

Source: individual study

■■■ widely used, ■■ used for selected activities, ■ limited use

In the functional approach, the logistic system of a large scale retail company is defined as a set of activities supporting the sales process. Its major purpose is to ensure optimum circulation of goods along with the information within the analysed companies and between all involved parties. Assuming the phase criterion, the logistic process performed in trading units is divided into supply phase and distribution phase. Considering the importance of the performed logistic activities in a large scale retail company, the process of supply, including the selection and assessment of supplier, and also preparation and submitting an order needs to be distinguished. Additionally, storage, inventorying, handling of returns to suppliers, complaint management and logistic customer service are also very important.

4. Defining the Assumptions and Rules of the Logistics Audit

It has been assumed that primary goal of the logistics audit in a large scale retail company is the verification and assessment of the current situation in terms of the circulation material goods as well as personal and information flows. On these grounds, it shall be determined whether the current situation should be maintained, or any advisory activities are required to

Phase	Stage	Symbol
Control	Determining the goal, stages, tasks and costs	I.A
	Development of an inspection plan	I.B
	Characterising the enterprise and its environment	I.C
	Characterising the logistics system	I.D
	Selection of criteria and parameters of assessment	I.E
	Measurement and indicative assessment	I.F
	Verification and interpretation of results	I.G
Advisory	Determining the goal and stages	II.A
	Determining the assumptions and rules in a scope required for improvement	II.B
	Development of an improvement plan	II.C
	Implementation and fulfilment of the improvement plan	II.D
	Measurement and indicative assessment	II.E
	Verification and interpretation of results	II.F

Table 2. Phases and stages of logistics audit in a large scale retail company

Source: individual study

prevent unfavourable circumstances, or any additional values must be implemented to optimise the function of the logistic system.

These tasks shall be carried out in two phases, i.e. control and advisory. Detailed characteristics are presented in Table 2.

The tasks performed as part of the logistics audit in the analysed enterprises, with reference to the persons in charge and the executive personnel, are summarised in Table 3.

Stage	Task	Person	
		K[1]	W[2]
I.A	Identification of goal, scope and person in charge	DS[3]	AG[4]
	Defining the stages of main goal fulfilment	AG	AG
	Assignment of person responsible for the stage fulfilment	AG	AG
	Assignment of persons to execute particular tasks	AG	AE[5]
	Determining tasks at individual stages	AG	AE
	Development of tasks fulfilment schedule	AG	AE
	Determining the overall cost of the logistics audit process – control phase	AG	AE
I.B	Preparing the *Inspection plan*	AG	AE
	Presentation of the *Inspection plan*	AG	AE
	Approval of the logistics audit process assumptions – control phase	DS	-
I.C	Obtaining basic data concerning the enterprise	AE	AZ[6]
	Identification of operating conditions of the enterprise	AE	AZ
I.D	Identification of the structure of logistic system	AE	AZ
	Inventory of operating resources used in logistic systems	AE	AZ
	Identification of logistic processes	AE	AZ
I.E	Determining and listing the criteria of assessment of logistic systems	AG	AE
I.F	Measurement of logistic systems	AE	AZ
	Calculating the indicators of assessment of the logistic system	AE	AZ
I.G	Preparing the *Logistics audit report – control phase*	AG	AE
	Presentation of the *Logistics audit report – control phase*	AG	AG
	Approval of the *Logistics audit report – control phase*	DS	-
II.A	Identification of goal, scope and person in charge	DS	AG
	Defining the stages of main goal fulfilment	AG	AG
	Assignment of person responsible for the stage fulfilment	AG	AG
II.B	Determining improvement goals	AG	AE
	Assignment of persons to execute particular tasks	AG	AE
	Assignment of tasks related with individual improvement goals	AG	AE
	Development of tasks fulfilment schedule	AG	AE
	Determining the overall cost of the logistics audit process – control phase	AG	AE
II.C	Preparing the *Improvement plan*	AG	AE
	Presentation of the *Improvement plan*	AG	AG
	Approval of the *Improvement plan*	DS.	-
II.D	Implementation of the *Improvement plan*	AE	AZ
	Fulfilment and validation of the *Improvement plan*	AE	AZ
II.E	Measurement of logistic systems	AE	AZ
	Calculating the indicators of assessment of the logistic system	AE	AZ
II.F	Preparing the *Logistics audit report – advisory phase*	AG	AE
	Presentation of the *Logistics audit report – advisory phase*	AG	AG
	Approval of the *Logistics audit report – advisory phase*	P/D	-

[1]K – inspection employee,
[2]W – executor,
[3]DS – decision maker, representing the analysed organisational unit, e.g. Store Manager,
[4]AG – lead auditor,
[5]AE – stage auditor,
[6]AZ – task auditor

Source: individual study

Table 3.
Tasks in the logistics audit procedure in a large scale retail company

For the purposes of preparation of the logistics audit procedure in a large scale retail company, methods and tools have been determined for every stage of audit. They are presented in Table 4.

Method and tools	Stage												
	I.A	I.B	I.C	I.D	I.E	I.F	I.G	II.A	II.B	II.C	II.D	II.E	II.F
Direct survey	x	x	x	x									
Indicative assessment					x	x						x	
Expert method	x	x			x		x	x	x	x	x		x

Table 4. Methods and tools of logistics audit in a large scale retail company

Source: individual study

Considering the scope and stages of the logistics audit in a large scale retail company, the logistic system assessment criteria have been determined. It has been assumed that the assessment must be both general, encompassing the entire logistic system and partial – regarding selected logistic subsystems. It will refer to production factors as well as performed logistic processes and environmental conditions. The used assessment criteria will include operability, efficiency, flexibility and continuity. Operability (effectiveness) shall mean the guarantee of reaching the demanded output condition (goal), efficiency (economy) will be interpreted as ensuring favourable relations between the input and the output of the system (costs and effect), flexibility shall be the answer to the question whether the accepted activities allow to respond properly to the changes occurring on the market, and continuity shall be the guarantee of uninterrupted operation (Kisperska-Moroń, Krzyżaniak 2009, p. 57; Gwynne R., 2017, p. 40).

The accepted criteria of logistic system (subsystem) assessment are summarised in Table 5.

Assessment criteria	Human work	Logistic infrastructure	Subject of work	Process	Environment
operability	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}
efficiency	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}
flexibility	x_{31}	x_{32}	x_{33}	x_{34}	x_{25}
continuity	x_{41}	x_{42}	x_{44}	x_{44}	x_{45}

Table 5. Criteria of logistic system (subsystem) assessment in a large scale retail company
Source: individual study

For the purposes of the logistics audit in a large scale retail company, proper scope of documentation must be determined. Considering the phase criterion of the logistics audit, two groups of documents have been distinguished, regarding the control and advisory phase. Additionally, they were grouped as input and output documents. Input documents are existing documents, i.e. secondary sources, kept by the enterprise or in the closest environment.

No.	Name	Localization
1	Corporate strategy	Assistant Manager
2	Quality System documentation	
3	Codes of conduct	Commercial department Goods acceptance and release department Customer service department OHS specialist
4	Organisational structure	HR department
5	Employees database	
6	Employees scope of responsibilities	
7	Work regulations	
8	Work schedule	
9	Work time sheet	
10	Plans of buildings and structures	Technical department
11	List of operating resources	Technical department IT department
12	Technical specifications of operating resources	
13	Procurement process documentation	Commercial department Goods acceptance and release department Financial and accounting department
14	Warehousing process documentation	
15	Return process documentation	
16	Inventory process documentation	
17	Customer service documentation	Commercial department Customer service department
18	Complaint management process documentation	

Table 6. Input documents for the logistics audit procedure in a large scale retail company
Source: individual study

Table 6 contains the list of input documents.

Output documents are forms assigned to specific stages or tasks. They will have a definite purpose and structure and will be filled and approved by an appointed person. Based on these forms, collective reports will be prepared. In the preliminary phase, at the planning stage – Inspection plan, while at the fulfilment stage: *Logistics audit report – control phase*. In the second phase, at the planning stage – *Improvement plan*, and at the fulfilment stage: *Logistics audit report – advisory phase*.

It must be noted that the fulfilment of the logistics audit procedure in a large scale retail company requires following certain rules of conduct. Such rules must include:

- the sequence of activities, the audit must be performed according to a previously accepted procedure;
- comprehensiveness rule, the scope of the audit must include all identified elements of the analysed system;
- regularity rule, the logistics audit must be conducted regularly, according to an accepted schedule;
- independence rule, which is manifested by the freedom to set the scope of accepted and performed tasks and to provide feedback;
- verification and assessment rule, following the accepted procedure must lead to identification of circumstances and processes that might be problematic in the analysed enterprise and to assess their effects on proper functions of the unit;
- usefulness rule, it is significant that the final conclusions of the audit must allow to maintain specific demanded processes and/or develop preventive or corrective actions, if any irregularities are found;
- effectiveness rule, the final result of the activity is to ensure proper relations between the input and the output, i.e. the costs incurred and obtained effects.

5. Conclusions

The proposed procedure for preparation and fulfilment of the logistics audit in a large scale retail company is an important tool of review and assessment of organisation and management in logistic systems. The accepted solution includes practical guidelines facilitating the preparation and proceeding with the logistics audit. The proposed scheme of proceedings and the method of its application in the logistic systems of large scale retail companies allows to implement similar solutions in other economic systems.

References

[1] Dryl W. (2010). *Audyt marketingowy*, Cedetu.pl Wydawnictwo Fachowe, Warsaw.
[2] Grocholski H. (ed.) (2004). *Praktyczne aspekty audytu wewnętrznego*, Instytut Rachunkowości i Podatków, Warsaw.
[3] Gwynne R. (2017). *Warehouse Management: A Complete Guide to Improving Efficiency and Minimizing Costs in the Modern Warehouse*, 3rd Edition, Kogan Page.
[4] Jedynak Z. (2017). *Audyt logistyki w przedsiębiorstwach handlu detalicznego wielkopowierzchniowego*, CeDeWu, Warsaw.
[5] Kisperska-Moroń D., Krzyżaniak S. (ed.) (2009), *Logistyka*, Biblioteka Logistyka, Poznań.
[6] Kizukiewicz T. (ed.) (2013), *Audyt wewnętrzny w strukturze kontroli zarządczej*, Difin, Warsaw.
[7] Lisiński M. (ed.) (2011). *Audyt wewnętrzny w doskonaleniu instytucji – aspekty teoretyczno-metodologiczne i praktyczne*, Polskie Wydawnictwo Ekonomiczne, Warsaw.
[8] Markham W. (1999). *Logistics Audit* (*Financial Times Series*), Pearson Professional Education.
[9] O'Regan D. (2003). *International Auditing: Practical Resource Guide*, John Wiley & Sons.
[10] Winiarska K. (2005). *Teoretyczne i praktyczne aspekty audytu wewnętrznego*, Difin, Warsaw.

Revisited Intention on Islamic Heritage Destination in Indonesia

Wan SURYANI[1], Jasanta PERANGINANGIN[2], Errie MARGERY[3], LUSIAH[4], Ahmad Ikhwan SETIAWAN[5]

[1]Universitas Medan Area, Indonesia
[2]Corresponding Author, Sekolah Tinggi Pariwisata Sahid Surakarta, Indonesia; E-mail: jasanta_pa@gmail.com
[3]STIE Professional Manajemen College, Indonesia
[4]Sekolah Tinggi Ilmu Ekonomi IBBI, Indonesia
[5]Universitas Sebelas Maret Surakarta, Indonesia

Abstract

This research aims to establish a research model about revisited intention on Islamic heritage destination. The next developed model is identified of each variable to find out its strength and the relation toward other variables. The variables in this research are destination facilities completeness, service quality, visitor satisfaction, and revisit intention. The unit analysis is 250 questionnaires that are given to the visitors of Islamic heritage destination. The analysis tool of this research is software IBM SPSS 22 and AMOS 22. From 5 developed hypothesis of this research in which destination facilities completeness has significant effect to the satisfaction, destination facilities completeness does not affect significantly to revisit intention, service quality affects significantly toward revisit intention, and visitor satisfaction affects significantly to the revisit intention.

Keywords: *destination facilities completeness; service quality; visitor satisfaction; revisit intention.*

1. Introduction

Tourism industry has developed rapidly, there are lot of destinations that are offered by the organizer of tourism business. In the midle of a very rapid tourism business competition, tourism business executives and companies compete to register as many visitors as possible and try to make the visitors interested to revisit (Bigne et al., 2009).

A country that has a long history, in its journey has many relics of cultures that can be made as superior tourism destinations (Menga et al., 2011). Indonesia has more than 260 million population with 17 thousand islands, 1,331 ethnic groups, and 1211 languages. Each of them has distinctive characteristics and long historical values, therefore Indonesia has lots of opportunity in tourism business with historic tourism sites.

The cultural advantages possessed by Indonesia can be used as a competitive advantage to advance the nation (Porter, 1990, Peranginangin, 2015). A lot of ways can be used to achieve the eminence that is needed especially in tourism area (Peranginangin and Kusumawardhani, 2018). It can be done by combining several comprehensive strategies (Setiyaningrum and Peranginangin, 2018).

Based on the theory of customer culture Arnould and Thompson (2005) this research wants to establish a model about antecedents of the revisited intention to the historic tourism site. Heritage has enchantment to advance tourism business because it has wide effect (Laroche, 2009). The numbers of Islamic heritage destination in Indoensia make this research very interesting and valuable to conduct.

2. Literary Reviews

2.1. Revisited Intention

Revisited intention of the visitors to tourism destination is influenced by previous pleasant coming (Alegre and Cladera, 2009). Revisited intention to the destination is an intention that is triggered by pleasant experience. The pleasant experience identifies the visitors' satisfaction to the tourism destination (Kim et al., 2010).

The increased level visitation is influenced by several factors such as facilities completeness that is given in the tourism spots and how the destination spots establish themselves (Lai et al., 2010). Revisited intention has a dimension in which it has desire to revisit from the visitors, the suitability with tourism spot, the desire to once more experience the tourism heritage, the feasibility of the location and the affordable cost for the visitors (Som et al., 2012).

2.2. Visitor's Satisfaction

The visitor's satisfaction in the tourism spots is a crucial factor for which the satisfied visitor will revisit the destination and vice versa, If the visitors feel dissatisfied, they will never revisit to the tourism spots (Supitchayangkool, 2012). The satisfied visitors will spread and recommend the spots to their family and their friends to have a visit. (Berezina et al., 2012).

The visitor's satisfaction index becomes very important to be benchmark for establishing a heritage tourism destination (Song et al., 2012). This visitor' satisfaction index is made by taking into account the convenience of visitors, the visitors pleasure, conformity with the needs of visitors, and the satisfaction feeling with provided services (Peranginangin, 2019).

2.3. Destination Facilities Completeness

The completeness of facilities on the destination is demanded by visitors because it is the secondary purpose that is greatly influenced by the completeness of the facilities (Jakosuo, 2011). In order to increase the visitor satisfaction and the revisited intention, the quality improvement and completeness of tourist facilities must be improved (Tsenga et al., 2011).

Completeness of the destination facilities have a significant influence on visitor satisfaction (Sapari et al., 2013). Some of the main facilities are needed by visitors such as sanitation facilities, worship facilities, security facilities, easy access facilities, and adequate parking facilities. Destination facilities completeness will have a wide impact on visitors such as the desire to revisit, recommend to colleagues, and word of mouth.

Based on the explanation above, several hypotheses can be made as below:

H1: The higher level of destination facilities completeness ensues the higher level of visitor satisfaction

H2: The higher level of destination facilities completeness ensues the higher the level of revisit intention

2.4. Service Quality

The study in service quality is endless because in running a tourism business service quality becomes very vital (Pollack, 2008). Service quality has a positive effect on visitor satisfaction so that the quality of compulsory service is gradually increased by the manager of tourism area (Ting et al., 2011).

Service quality is reflected by the quality of visitors' experience to the tourist spot manifested in quick service, hospitality from officers, using good equipment, providing a sense of security to visitors, and visitors are always served with a smile (Artuger and Cetinsoz, 2017). Peranginangin (2018) also explains that the service quality greatly influences the revisited intention of tourism spot.

Based on the explanation above, several hypotheses can be made as below:

H3: The higher level of service quality ensues the higher the level of visitor satisfaction

H4: The higher level of service quality ensues the higher the level of revisited intention

H5: The higher level of visitor satisfaction ensues the higher level of revisited intention

According to the results and development of discussed hypotheses, a model is proposed as shown below:

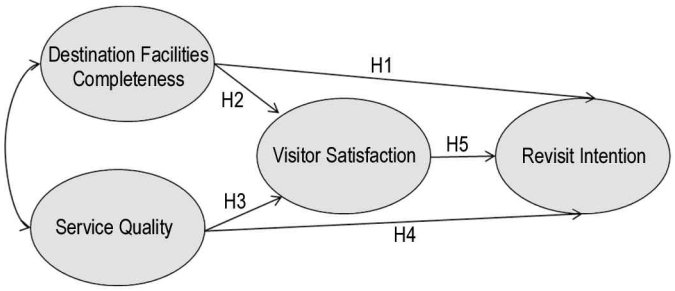


Figure 1. Proposed Model
Source: Developed for this study (2018)

3. Research Method

3.1. Object Research and Analysis Unit

The object of this research is a tourism spot of Islamic heritage in Indonesia. The used unit of analysis is the visitors of Islamic heritage attractions in Indonesia. This study uses structured questions with closed questions and open questions. In this study, 250 questionnaires were distributed with a return rate of 211 questionnaires or 84%, this number has fulfilled as required in data processing by using structural equation models with AMOS software (Hair et al., 2010, Tabachnick and Fidell, 2007).

The gender of the respondents in this study were 93 males or 44% and 118 females or 56%. While married visitors are 50% or 106 and those who are unmarried are 50% or 105 people. Based on the level of education, the number of visitors who have education level equivalent to high school is only 8.5% or 18 people while the remaining amount is 203 or 91.5 from bachelor degree program.

3.2. Analysis Technique

This research method uses quantitative research methods by using structural equation models with AMOS software. The given list of questions and the chosen respondents have to fulfill the predetermined criteria (Zikmund et al., 2012). The construct reliability in this study uses convergent validity of .500.50 and construct reliability ≥0.70, then it is used to measure the suitability of the model conceptually and empirically uses a goodness of fit index, among which chi square is expected to be small, probability ≥ 0.05, Gfi <AGFI, CFI, and TLI getting closer to one the better, the last is RMSEA (Arbuckle, 2014, Tabachnick and Fidell, 2007).

4. Data Analysis and Model Testing

4.1. Validity testing and Reliabilities

The validity and reliability tests use convergent validity, the average variance value is extracted with cut-off value of ≥ 0.50 and construct reliability with a cut-off value of ≥ 0.70. The testing uses the results of the standardized loading factor from each indicator. The results of convergent validity and contract reliability testing are presented in the table below.

No	Variable/Indicators	Std. Loading (Lambda Value)	Convergent Validity (AVE) ≥0.50	Construct Reliability ≥0.70
1	Destination Facilities Completeness			
	DFC1	0.690		
	DFC2	0.703	0.545	0.841
	DFC3	0.815		
	DFC4	0.700		
	DFC5	0.671		
2	Service Quality			
	SQ1	0.730		
	SQ2	0.819	0.678	0.935
	SQ3	0.912		
	SQ4	0.916		
	SQ5	0.914		
3	Visitor Satisfaction			
	VS1	0.967		
	VS2	0.96	0.841	0.955
	VS3	0.903		
	VS4	0.832		
4	Revisit Intention			
	RI1	0.832		
	RI2	0.895	0.740	0.910
	RI3	0.853		
	RI4	0.771		
	RI5	0.729		

Table 1. Construct Reliability & Convergent Validity
Source: Developed for this study (2018)

The results in table 1 indicate that the variables destination facilities completeness, service quality, visitors' satisfaction, and revisited intention have very good loading factor. The results of convergent validity data show that the number for destination facilities variable completeness is 0.545, for service quality variable shows 0.678, the visitor satisfaction variable shows 0.841, and the variable revisited intention shows 0.740. Convergent validity shows the number exceeds the required one which is 0.50, it means that all indicators are reflection of the variables under study.

The results on the data construct reliability show that the destination facilities variable completeness is 0.841, the service quality variable shows 0.935, the visitor satisfaction variable shows 0.955, and the revisited intention variable shows 0.910. This reflects that all indicators in this study are reliable and reflect the studied data because it has exceeded the required number that is 0.70.

4.2. Goodness of Fit Index

Based on the results of the data processing using Amos software shows the chi-square value is 566,482 good enough, probability is 0.001 good enough, Cmin / DF value is 3.88, GFI is 0.746, AGFI is 0.669, CFI is 0.866, and TLI is 0.843 good enough, so it can be concluded that there is a conceptual and empirical suitability of the model.

4.3. The Hypothesis Testing Results

The results of hypothesis testing in full model of structural equation model are presented in the figure below:

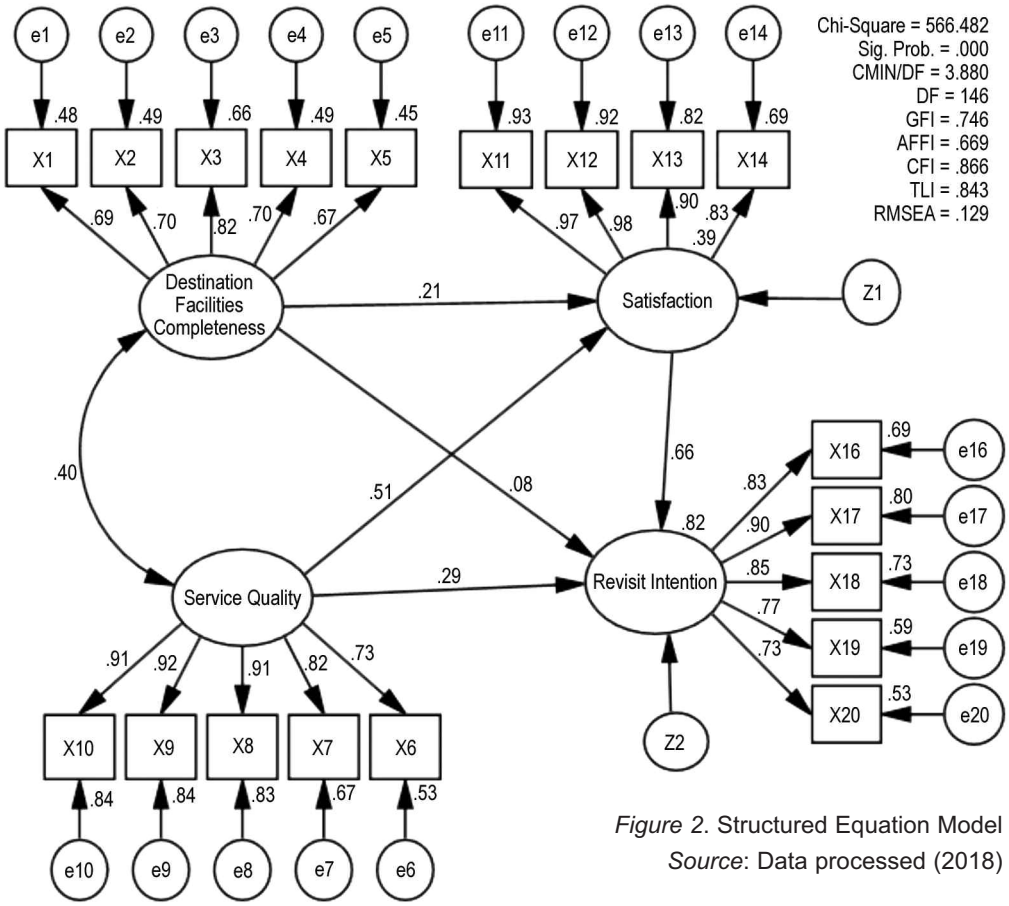


Figure 2. Structured Equation Model
Source: Data processed (2018)

The data results show the effect of destination facilities completeness on visitor satisfaction with a CR value of 2,681 is accepted, the effect of destination facilities completeness on revisited intention with a CR value of 1,602 is rejected, the effect of service quality on visitor satisfaction with a CR value of 6,377 is accepted, the effect of service quality on revisit intention with CR value of 4.614 accepted, and the effect of visitor satisfaction on revisited intention with CR value 10.576 is accepted.

No	Hypothesis	Estimate	S.E	C.R	P	Result
1	Destination Facilities Completeness → Visitor Satisfaction	.273	.102	2.681	.007	Accepted
2	Destination Facilities Completeness → Revisit Intention	.081	.051	1.602	.109	Rejected
3	Service Quality → Visitor Satisfaction	.768	.120	6.377	***	Accepted
4	Service Quaity → Revisit Intention	.323	.070	4.614	***	Accepted
5	Visitor Satisfaction → Revisit Intention	.492	.047	10.576	***	Accepted

Table 2. Regression Weights Structural Equation Model
Source: Developed for this study (2018)

Based on the results of Structural Equation Regression Weights Model 1 hypothesis which states that the higher level of destination facilities completeness ensues the higher level of visitor satisfaction are proven to give a very significant effect. Hypothesis 2 which states that the higher level of completeness of destination facilities ensues the higher level of revisit intention, it is proven insignificant. Hypothesis 3 states that the higher the level of service quality ensues the higher the level of visitor satisfaction, it is proven to give very significant effect. Hypothesis 4 stated that the higher the level of service quality ensues the higher level of revisit intention, it is proven to be very significant. And hypothesis 5 which stated that the higher the level of visitor satisfaction ensues the higher level of revisited intention, it is proven to be very significant. The five hypotheses in this study only hypothesis 2 is rejected and has no significant effect.

5. Conclusion and Suggestion

Revisited intention of visitors to tourism places heritage is a main key to sustain the tourism business for developing economy in the community where heritage objects are located. Therefore, the development of destination facilities completeness becomes absolute and must be carried out periodically in accordance with the development of market tastes. Likewise, the development of service quality is main priority because it is a major factor in increasing satisfaction and intention for the visitors to revisit the Islamic heritage destinations.

Based on the results, it can be concluded that the concept of revisited intention can be increased through increasing destination facilities completeness and service quality mediated by visitors' satisfaction of Islamic heritage destinations. From the five hypotheses built, two of them 'the effect of destination

facilities completeness on revisited intention', 'the effectiveness of destination facilities completeness on revisited intention' must be bridged by visitor satisfaction. The other hypotheses proved to give significant effect according to previous studies.

The difference between the results of study toward the effect of destination facilities completeness on revisited intention becomes a research gap that requires to solve in the future. Future research also needs to add other variables so that the model of increasing revisited intention in Islamic heritage destination becomes more comprehensive and more deterministic.

References

[1] Alegre, J. N. & Cladera, M. (2009). Analyzing the Effect of Satisfaction and Previous Visits on Tourist Intentions to Return. *European Journal of Marketing*, Vol. 43, No. 5/6, pp. 670-685.

[2] Arbuckle, J. L. (2014). *IBM SPSS Amos 23 User's Guide, United State od America*, Amos Development Corporation. pp. 1-675.

[3] Arnould, E. J. & Thompson, C. J. (2005). Consumer Culture Theory (CCT): Twenty Years of Research. *The Journal of Consumer Research*, Vol. 31, No. 4, pp. 868-882.

[4] Artuger, S. & Cetinsoz, B. C. (2017). The Impact of Destination Image and The Intention to Revisit: A Study Regarding Arab Tourists. *European Scientific Journal*, Volume 13, No. 5. 82-98.

[5] Berezina, K., Cobanoglu, C., Miller, B. L. & Kwansa, F. A. (2012). The Impact of Information Security Breach on Hotel Guest Perception of Service Quality, Satisfaction, Revisit Intentions and Word-of-Mouth. *International Journal of Contemporary Hospitality*, Vol. 24 No. 7, pp. 991-1010.

[6] Bigne, J. E., ´Nchez, I. S. & Andreu, L. (2009). The Role of Variety Seeking in Short and Long Run Revisit Intentions in Holiday Destinations. *International Journal of Culture, Tourism, and Hospitality Research*, Vol. 3 No. 2, pp. 103-115.

[7] Hair, J. F., Black, W. C., Babin, H. J. & Anderson, R. E. (2010). *Multivariate Data Analysis*, Pearson Prentice Hall.

[8] Jakosuo, K. (2011). Russia and the Russian Tourist in Finnish Tourism Strategies – The Case of the Karelian Region. *Procedia Social and Behavioral Sciences*, Vol. 24. pp. 1003-1013

[9] Kim, Y. H., Kim, M. & Taylor, T. R. A. J. (2010). An Examination of Festival Attendees' Behavior Using SEM. *International Journal of Event and Festival Management*, Vol. 1 No. 1, pp. 86-95.

[10] Lai, C.-N., Yu, T.-K. & Kuo, J.-K. (2010). How to Say Sorry: Increasing Revisit Intention through Effective Service Recovery in Theme Parks. *Social Behavior and Personality*, Vol. 38, pp. 509-514.

[11] Laroche, M. (2009). Impact of culture on marketing strategy: Introduction to the special issue. *Journal of Business Research*, 62, 921-923.

[12] Menga, Z., Wei, Y. & Yu, Y. (2011). On Life Cycle of Cultural Heritage Engineering Tourism: A Case Study of Macau. *Systems Engineering Procedia*, Vol. 1, pp. 351-357.

[13] Peranginangin, J. (2015). A Conceptual Mapping Resource Advantage Theory, Competitive Advantage Theory, and Transient Competitive Advantage. *Expert Journal of Business and Management*, Vol. 3, Issue 2, pp. 140-149.

[14] Peranginangin, J. (2019). Antecedents of Revisited Intention: Evidence from Indonesia Zoo Tourism. *Journal of Accounting and Management*, 64, pp. 1-14.

[15] Peranginangin, J. & Kusumawardhani, A. (2018). Islamic Relationship Value, Adaptive Selling, and Relationship Quality Effect to Sales force Performance. *Journal of Business and Retail Management Research*, Vol. 12, pp. 37-42.

[16] Pollack, B. L. (2008). The Nature of the Service Quality and Satisfaction Relationship. *Managing Service Quality*, Vol. 18, No. 6, pp. 537-558.

[17] Porter, M. E. (1990). The Competitive Advantage of Nations. *Harvard Business Review*, March-April.

[18] Sapari, M. S., Shuib, A., Ramachandran, S. & Afandi, S. H. M. (2013). Visitors' Satisfaction towards Service and Facilities in Kilim Karst Geoforest Park, Langkawi. *Journal of Applied Economics and Business*, Vol. 1, Issue 4, pp. 25-42.

[19] Setiyaningrum, W. & Peranginangin, J. (2018). Convergent Strategy towards Competitive and Sustainability Competitive Advantages in Online Media Competition. *International Journal of Civil Engineering and Technology*, Vol. 9, pp. 499-507.

[20] Som, A. P. M., Marzuki, A., Yousefi, M. & Abukhalifeh, A. A. N. (2012). Factors Influencing Visitors' Revisit Behavioral Intentions: A Case Study of Sabah, *Malaysia International Journal of Marketing Studies*, Vol. 4, No. 4, pp. 39-50.

[21] Song, H., Veen, R. V. D., Li, G. & Chen, J. L. (2012). The Hong Kong Tourist Satisfaction Index. *Annals of Tourism Research*, Vol. 39, No. 1, pp. 459-479.

[22] Supitchayangkool, S. (2012). The Differences between Satisfied/Dissatisfied Tourists towards Service Quality and Revisiting Pattaya, Thailand. *International Journal of Business and Management*, Vol. 7, No. 6, pp. 30-39.

[23] Tabachnick, B. G. & Fidell, L. S. (2007). *Using Multivariate Statistics*, United State of Amerlca, Pearson Education. Inc. pp. 1-980.

[24] Ting, K., Ru-Liang, K. & Xiao-Juan, M. (2011). Research on Service Quality Engineering Management of Tourist Destination. *Systems Engineering Procedia*, Vol. 1, 309-316.

[25] Tsenga, M.-L., Chiub, A. S. & Vo, M. P. N. (2011). Evaluating The Tourist's Demand to develop Vietnamese Tourism Performance. *Social and Behavioral Sciences*, Vol. 25, pp. 311-326.

[26] Zikmund, W. G., Babin, B. J., Carr, J. C. & Griffin, M. (2012). *Business Research Method*, United State of America, Cengage Learning. pp.1-674

Corporate Governance and Earnings Management Practices in Indonesian Banking Sector

Siti PURYANDANI[1*], Hesti Asih KUSUMAWATI[2], Robiyanto ROBIYANTO[3]**

[1]Assistant Professor, Department of Management, STIE Bank BPD Jateng, Jl. Soekarno Hatta No. 88, Semarang 50246, Central Java, Indonesia; E-mail: sitipuryandani@gmail.com
[2]Student, Department of Management, STIE Bank BPD Jateng, Jl. Soekarno Hatta No. 88, Semarang 50246, Central Java, Indonesia; E-mail: bsbud2013@gmail.com
[3]Assistant Professor, Department of Management, Faculty of Economics and Business, Satya Wacana Christian University, Jl. Diponegoro No. 52-60, Salatiga 50711, Indonesia; E-mail: robiyanto@staff.uksw.edu
*Corresponding Author
**Co-Corresponding Author

Abstract

This study was aimed to determine some corporate governance related variables on earnings management practices. Some variables involved and tested in this study were institutional ownership, independent board of commissioners proportion, and bonus compensation. The samples used in this study were banking companies listed in the Indonesia Stock Exchange, with observation period from 2011-2015. 27 companies were indicated to apply earnings management practices. Through logistic regression and hypotheses testing, several conclusions were formulated. They were: institutional ownership influenced earnings management practices negatively, therefore, the lower percentage of institutional ownership, the higher possibility to apply earnings management practices; independent board of commissioners proportion influenced earnings management practices negatively, thus, the lower proportion of independent board of commissioners, the more likelihood to perform earnings management practices; bonus compensation influenced earnings management practices positively, therefore, the higher bonus compensation promised, the higher probability of applying earnings management practices.

Keywords: *corporate governance; institutional ownership; independent board of commissioners; compensation bonus; earnings management.*

1. Introduction

Technological advances and information flows in globalization era require each company to present useful information to information users, such as investors and stakeholders. They cause harder competition. In expanding its business scale or market share, of course, every company needs a large amount of funding sources in order to be able to compete with the others. The investors who want to invest their money to a certain company needs information to explain the financial condition. This information is disclosed in financial statements. Financial statements are the sources of some information about the condition and performance of a company for external parties. Such information concerns the financial position as performance of a company that is beneficial to a large number of users in making economic decisions (Purwanti and Natser, 2016, Ernayani and Robiyanto, 2016). The financial statements are performed to communicate accounting information to users to make relevant business decisions to a company to maintain and improve its financial position and performance (Puspitaningrum and Atmini, 2012, Mohammadi and Nezhad, 2015).

The financial statements users may come from internal parties such as directors, boards of commissioners and employees as well as external parties such as investors, creditors, government, and public. Internal parties use the financial statements as a material consideration in formulation of business policy, monitoring internal financial conditions, as well as moral responsibility in communicating the condition of the company. While external parties use it to analyze the condition of company in general. One important element in financial statements used to measure management performance is profit. Profit is one of important elements in measuring managerial performance. Profit information is a major concern for measuring company or management performance. Profits presented in financial statements may influence corporate decision making. The selection of appropriate methods under certain conditions indicates that management has been successful to present a good financial statements in order to produce a quality profit. The high profit quality of a company indicates its success in achieving its financial goal. The company's openness in reporting its earning indicates more qualified profit (Mohammadi and Nezhad, 2015).

Based on the real fact, the use of financial statements is only directed to earnings information, regardless of how the profit is gained. It encourages company management to take some action called earnings management. The tendency to pay more attention to earnings is based on management's judgment, especially by managers whose performance is measured based on such information. Thus, the condition causes dysfunctional behavior and one of them is earnings management. According to Saleh et al. (2005), earnings management occurs when management uses certain decisions in financial reporting. It is done to mislead the stakeholders in understanding the financial and economic performance and to influence contractual income that controls the accounting figures reported.

Earnings management is performed by managers or financial statements makers in financial reporting process of an

organization because they expect a benefit from their action (Hermiyetti and Malik, 2013). Earnings management can degrade the credibility of financial statements in making decisions because it has been a manipulation of financial statements as the target of communication among managers and external parties (Utama and Musa, 2011). According to Tong and Junarsin (2013), Handriani and Robiyanto (2019), the concept of earnings management was formulated by the agency theory approach which explains that earnings management practices were influenced by conflicts among management interests (agent) and shareholders (principal) because each party wants to achieve the certain level of prosperity.

One of the strategies in earnings management is how to increase reported earnings in a given period to make the company financially better appraised. It also allows the earnings to increase over several periods. The companies can report higher earnings level caused by aggressive earnings management over a long period. There are many reasons for earnings management, such as to increase compensation for managers related to reported earnings, increase share prices, and get subsidies from the government. The arising problem is how to detect earnings manipulation or earnings management practices where such behavior has been predicted in agency theory. Agency theory hypothesizes that management try to maximize the prosperity for improving financial performance through rapidly increasing revenues, but it is not carried out through long term effort based on a reasonable process. Saleh et al. (2005) considered it to be contrary to shareholders aspiration. Apparently, there are still many contradictions regarding the use of earnings management as a real manipulation of business assets. The earnings management practices must be able to erode public trust to external financial statements and hinder the role of model flow competencies within the capital market, and degrade the quality of a company's financial statements. Earnings management is also detrimental to investors because they will not accept correct information about the company's financial position.

Implementation of earnings management is driven by several goals, one of them is to persuade the investors that they are willing to invest the funds owned. According to AlNajjar and Riahi-Belkaoui (2001), there were two corporate management objectives for earning management practices. The first was to increase profit transparency to communicate various matters related to internal company information and the second was to maximize profit for itself. On the other hand, earnings management practices impact on the usefulness of profit information in stakeholder decision making. Instead, a company should implement good corporate governance mechanisms in its control and management system to minimize earnings management practices. The role and demands of foreign investors and creditors is implementation of Good Corporate Governance as one of the factors in investment decision making. Good Corporate Governance mechanism is able to present a financial report with a good profit information (Handriani and Robiyanto, 2018b, Handriani and Robiyanto, 2018a, Handriani and Robiyanto, 2019). If the concept is well implemented, it is expected that economic growth will continue to increase in line with better corporate governance transparency and it will give many parties benefit, later (Utama and Musa, 2011, Adefemi et al., 2018). Good Corporate Governance encourages sustainability through management based on transparency, accountability, responsibility, independence, fairness and equality principles (Tuan and Tuan, 2016).

This research was conducted to test the impact of the structure of ownership and bonus compensation on earnings management in banking companies listed in Indonesia Stock Exchange. In this study, earnings management was measured through the Eckel index. The object of research was banking companies because banking was a type of service company with the aim of obtaining profit without determining the cost of goods. The company's earnings would be more accurately defined (from earnings management practices or obtained from the bank's operational activities such as credit interest income, spot and derivative transactions, and fee based income). When the company was indicated to implement earnings management practices, the situation would negatively or positively influence the company. Thus, banking companies were selected as the next object of research.

2. Hypothesis Formulation

2.1. The influence of Institutional Ownership on Earnings Management

Institutional ownership is one way to monitor managers' performance in managing a company. Thus, ownership by other institutions is expected to reduce earnings management behavior by managers. Institutional ownership is able to control the management through an effective monitoring process. According to Ameer (2010), institutional ownership was owned by financial institutions such as insurance companies, banks, pension funds and investment banking. Institutional ownership of shares was considered a sophisticated investor where a significant amount of ownership could monitor the management with the impact of reducing the manager's motivation to implement earnings management. Jensen and Meckling (1976) argued that institutional ownership had a very important role in minimizing agency conflicts among managers and shareholders. The existence of institutional investors was considered to be able to play the role as an effective monitoring mechanism in every manager's decision. It was due to institutional investors involved in strategic decision making so it was not easy to trust in the act of earnings management.

Cornett et al. (2007) found that institutional ownership negatively influenced earnings management practices. The smaller percentage of institutional ownership, the greater tendency of managers to make certain policies in manipulating earnings reporting. Because supervision by company and institutional investors might limit the behavior of managers. Such supervisory measures might encourage managers to focus more attention on company performance. Therefore, it reduced opportunistic or self-serving behavior. Thus, the first hypothesis of this study was:

H1: The stronger control of institutional investors, the less chance of managers to apply earnings management practices.

2.2. The Influence of Independent Board of Commissioners on Earnings Management

The more number of independent board of commissioners, the control on financial statements will be stronger and more objective (Handriani and Robiyanto, 2019, Beiner et al., 2004). Thus, fraud done by managers to manipulate earnings can be minimized and earnings management practices can be avoided. Related to earnings management practices, independent commissioners are not directly related to the companies they handle because they have the duty to supervise the directors of the company without pressure from any party (Adefemi et al., 2018, Al-Maskati et al., 2015, Jaffar et al., 2018). Thus, the work performed can be free from interference of any party. From this explanation, the second research hypothesis was:

H2: The more independent members of the board of commissioners, the less chance of managers to apply earnings management practices.

2.3. The Influence of Bonus Compensation on Earnings Management

Bonus compensation is a reward provided by the organization or company to the manager. Bonus compensation is one of the factors directly or indirectly that influences performance of managers. In compensating managers, a company must first do

fair assessment. The assessment contains the criteria for appraisal of employees (number of completed jobs, speed of work, communication with other workers, behavior, and knowledge of work) (Lewellen et al., 1987, Smith and Watts, 1992).

When a company promises compensation (bonus scheme), then managers will tend to take action to manage net income so they can maximize the bonus received. Bonus compensation significantly influences earnings management practices. It means that if the promised bonus compensation increases, earnings management practices will also increase and vice versa (Chhaochharia and Grinstein, 2009). Therefore, the third hypothesis of this research was:

H3: The more bonus compensation promised, the more chance for managers to apply earnings management practices.

3. Research Method

3.1. Population and Samples

Population of this study was banking companies listed in Indonesia Stock Exchange. The observation period was 2011 to 2015. Samples were selected through purposive sampling with several following criterions:

1. Banking companies listed in Indonesia Stock Exchange from 2011 to 2015.
2. Banking companies that published financial statements and annual reports successively from 2011 to 2015.
3. The data related to the research variables were listed in financial statements and annual reports.

3.2. Data

The secondary data was used as the basis for this study. Those data were:

1. Financial report of banking companies listed in Indonesia Stock Exchange, from 2011 to 2015.
2. The annual report of banking companies listed in Indonesia Stock Exchange, from 2011 to 2015.

3.3. Data Analysis Method

All the data collected were then analyzed to confirm the research conclusions based on previously developed hypothesis. Data analysis method applied was quantitative method through logistic regression testing.

3.4. Operational Definition

3.4.1. Earnings Management

Earnings Management was measured through Eckel Index. The formula applied for calculating the Eckel Index was:

Index Eckel = (CVΔI / CVΔS);
ΔI = Changes in profit within a certain period;
ΔS = Change of income within a certain period;
CV = Variation coefficient of variables (standard deviation divided by expected value);
CVΔI = Variation coefficient of earnings change;
CVΔS = Coefficient of variation of revenue change.

While, CVΔI and CVΔS were calculated through the formula of:

$$\text{CV}\Delta\text{I and CV}\Delta\text{S} = \sqrt{\frac{\sum(\Delta X - \Delta\bar{X})^2}{n-1}} : \bar{X}$$

ΔX = Profit change (I) or income change (S) from year n-1 to year n.

3.4.2. Independent Board of Commissioners

In this study, the proportion of independent board of commissioners was measured by dividing the number of independent board of commissioners by the total number of the company's board of commissioners.

3.4.3. Bonus Compensation

Management compensation program is the policy and procedure to compensate managers including awarding bonuses based on performance achievement for a certain period (Smith and Watts, 1992). Compensation was measured through dummy variables In this study, for the dummy variables they were:

1: the company that provided bonus compensation;
0: company that did not provide bonus compensation.

4. Data Analysis and Discussion

4.1. Descriptive Statistics Analysis

Descriptive statistics were indicated by the frequency and size of the central tendency, and shown in Table 1.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Not being indicated to apply earning management practices	36	26.7	26.7	26.7
Being indicated to apply earning management practices	99	73.3	73.3	100
Total	135	100	100	

Table 1. Frequency Description Analysis on Earnings Management (Eckel Index)
Source: Secondary data processed

From Table 1, from 135 data samples selected and then calculated through Eckel index formula, 36 companies (26.70%) were not indicated to apply earnings management practices and 99 the others (73.30%) were indicated to apply earnings management practices.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Not promising bonus compensation	22	16.3	16.3	16.3
Promising bonus compensation	113	83.7	83.7	100
Total	135	100	100	

Table 2. Frequency Description Analysis on Bonus Compensation
Source: Secondary data processed

Based on Table 2, from 135 data samples selected, through labeling of dummy variables (1 and 0), 22 companies (16.30%) did not promise bonus compensation and 113 the others (83.7%) promised bonus compensation.

4.2. Descriptive Statistics Analysis

Descriptive statistical analysis was applied to explain the independent variables of institutional ownership (X1) and independent board of commissioners (X2). Descriptive statistical analysis performed included the number, minimum value, maximum value, mean and standard deviation. Table 3 shows the results of the descriptive statistical analysis.

	N	Minimum	Maximum	Mean	Standard Deviation
Institutional Ownership	135	11.03	99.997	70.28562	22.7388667
Independent Board of Commissioners	135	35.333	80.000	56.60972	10.594152
Valid N (Listwise)	135				

Table 3. Descriptive Statistics Analysis from 2011 to 2015
Source: Secondary data processed

Based on Table 3, 135 independent variables of institutional ownership samples displayed a range of values from 11.03 to 99.997%. The value was derived from the division of institutional

shares number by all shares of the company. The minimum value of 11.03% was owned by PT Bank Woori Saudara Indonesia Tbk in 2012 and 2013. It meant that PT Bank Woori Saudara Indonesia Tbk only had 11.03% of institutional shares of 100% of the total shares. The maximum value of 99.997% was owned by PT Bank Mutiara, Tbk 2015. The average value of 70.28562 and the standard deviation of 22.738867 indicated a uniform spread of data and low deviations.

Independent variables of the independent board of commissioners displayed the range of values 33.333% to 80.000%. The value was obtained from the division of independent commissioners number by all boards of commissioners. The minimum value of 33.333% was owned by PT Bank Bumi Artha Tbk in 2011, 2012, 2013, 2014 and PT Bank Windu Kentjana International Tbk in 2011 and PT Bank Danamon Indonesia in 2014. Therefore, three banks had 33.333% of total board of commissioners within the company.

The highest score was 80.000% and it was owned by PT Bank ICB Bumiputera, Tbk in 2011 and PT Bank Pembangunan Daerah Jawa Barat and Banten, Tbk year 2014. The average score of 56.60972 and standard deviation of 10.594151 indicated uneven data distribution and low deviations.

4.3. Logistic Regression Analysis Results

Logistic regression testing was applied to test the research hypothesis because one non-metric (nominal) independent variable was involved. In logistic regression testing, dichotomous independent variables (dummy nominal scale data with two categories 1 and 0) were predicted. Value 1 was a company that promised bonus compensation and 0 for companies that did not promise bonus compensation.

The first analysis was conducted to assess the feasibility of regression model and goodness of fit test through Chi Square on Hosmer and Lemeshow Test. The test was performed to prove null hypothesis (“Empirical data is in accordance with the model” or “There is no difference between the model and the data” so that the model was fit). The value of Hosmer and Lemeshow Goodness of fit statistics was 1.963 with a probability significance of 0.982. The value was more than 0.05. Thus, the model was acceptable and the regression model was feasible to be applied for further analysis as shown by Table 4.

Step	Chi-Square	D.F.	Sig.
1	1.963	8	0.982

Table 4. Hosmer and Lemeshow Test
Source: Secondary data processed

The next analysis was the overall model assessment through the overall model fit test assessed from the Log-Likelihood (-2LL) value as shown in Table 5.

Iteration		-2 Log likelihood	Coefficient Constant
Step 0	1	156.741	0.933
	2	156.577	1.010
	3	156.577	1.012
	4	156.577	1.012

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	110.532	0.287	0.419

Table 5. Overall Fit Test
Iteration History
Source: Secondary data processed

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Table 5 showed that the value of -2LL at the beginning (Block Number = 0) where the model only included the constant was 156.577. While the value -2LL at Block Number = 1 where the model enter independent variable constant decreased to 110.532. It meant means that -2LL Block Number = 0 was greater than the -2LL Block Number = 1. Thus, the regression model was considered feasible or better.

In Table 5 it was also indicated that the value of Cox and Snell R Square was 0.287 and the value of Nagelkerke R Square was 0.419. Both values indicated that the variability of the dependent variable explained by independent variables was 42%. The 2 x 2 classification table displayed true and false estimation values. The columns were two predicted values of earnings management dependent variable. Both were "being indicated to apply earnings management" (1) and "not being indicated to apply earnings management" (0). While the line showed the actual observation value of both as shown in Table 6.

Table 6 showed that 7 companies were indicated to apply earnings management practices. While on the actual observations, 92 companies were indicated to apply earnings management practices. Based on the predictions, 20 companies did not apply earnings management practices and based on actual observations 16 companies did not do it. Therefore, the accuracy of the model in predicting the overall observation was 83%. The higher percentage, then it was better from 0-100% range.

Observed	Predicted Eckel Index		Percentage Coefficient
	Not being indicated to apply earning management practices	Being indicated to apply earning management practices	
Not being indicated to apply earning management practices	20	16	55.6
Being indicated to apply earning management practices	7	92	92.9
			83.0

Table 6.
Analysis Model Classification
Classification Table

Source:
Secondary data processed

The last analysis applied was the regression coefficient test to ensure the influence of all independent variables in the model to the dependent variable. The regression coefficient could be determined by Wald statistic and the probability value (sig), as shown in Table 7.

	B	S.E.	Wald	D.F.	Sig.	Exp. (B)
Ins_Ownership	-0.054	0.015	13.187	1	0.000	0.948
Independent_Commissioners	-0.076	0.025	9.226	1	0.002	0.927
Bonus_Compensation	1.937	0.587	10.881	1	0.001	6.941
C	8.278	2.109	14.314	1	0.000	2924.099

Table 7. Coefficient of Analysis Model Logistic Regression
Variables in the Equation
Source: Secondary data processed

From the model above, the interpretation was expressed as shown by the variable output in the following equation model of regression analysis:

Ln EM / (1-EM) = 8.278 -0.054X1 -0.076X2 + 1.937X3

Where:

EM = Earnings Management;
X1 = Institutional Ownership;
X2 = Independent Board of Commissioners;
X3 = Bonus Compensation.

Hypothesis 1 Testing

From the logistic regression equation, it was shown that the coefficient sign of X1 (institutional ownership) was -0.054. It meant that any reduction in institutional ownership would increase the possibility to apply earnings management practices of 0.054.

Hypothesis 2 Testing

The value of the regression coefficient of X2 (independent board of commissioners) was -0.076. It could be interpreted that every deduction of 1 person of independent board commissioners and other variable was constant, then the possibility of a company to apply earnings management practices was increased of 0.076.

Hypothesis 3 Testing

The value of the regression coefficient of X3 (bonus compensation) was 1.937. Thus, if each company promised bonus compensation to managers and other variables were constant, then the likelihood for a company to apply earnings management practices was 1.937.

4.3.1. The Influence of Institutional Ownership on Earnings Management

The conclusions of this study indicated sign compatibility. Institutional ownership influenced earnings management practices and the first hypothesis was accepted. Acceptance of the first hypothesis indicated that the lower institutional ownership influenced earnings management practices. The reduction in the amount of institutional ownership was very influential on controlling and monitoring systems within a company. The reduction of institutional ownership would result in less institutional investors' supervision and the company could not control the manager's behavior and it would ultimately reduce agency costs.

Institutional ownership has significant meaning in controlling the company's management because it would increase supervision. Obviously, the control would ensure shareholder wealth because the influence of institutional ownership as regulatory agents could be suppressed through considerable investment in the capital market. Institutional ownership was also able to control the behavior of the management through an effective monitoring process so that this situation might reduce earnings management practices.

Concentration of institutional ownership was measured by percentage of total shares owned by the institution on total number of shares (at least 20%). This variable measurement referred to the Accounting Principle Board (APB). Based on sample, some banking companies such as PT. Bank Windu Kentjana International, Tbk. (2011), PT. Bank Woori Saudara Indonesia, Tbk. (2011), PT. Bank Windu Kentjana International, Tbk. (2012), PT. Bank Woori Saudara Indonesia, Tbk. (2012), Bank Windu Kentjana International, Tbk. (2013), and PT. Bank Windu Kentjana International, Tbk. (2014) had a proportion of institutional shares of less than 20%. It meant that the proportion of institutional shares was very low and it lowered the supervisory level of institutional investors. When the proportion of institutional shares was less than 20%, then the company is indicated to apply earnings management practices.

However, although PT. Bank Windu Kentjana International, Tbk. (2012), and PT. Bank Woori Saudara Indonesia, Tbk. (2012) had proportion of institutional shares of less than 20%, they were not indicated to apply earnings management practices. Some of these banking companies continued to be monitored by institutional investors even though the proportion of institutional shares was less than the average percentage. Therefore, several other factors could minimize such action.

Other banking companies such as PT Bank Rakyat Indonesia Agroniaga, Tbk (2011), PT Bank of India Indonesia, Tbk (2011), PT Bank of India Indonesia, Tbk (2012) PT Bank Negara Indonesia Tbk (2013), PT Bank Internasional Indonesia Tbk (2013), PT Bank Negara Indonesia Tbk (2014), PT Bank of India Indonesia, Tbk (2014) , PT Bank Rakyat Indonesia, Tbk (2015), PT Bank Negara Indonesia Tbk (2015), PT Bank Internasional Indonesia Tbk (2015), and PT Bank of India Indonesia Tbk (2015) had proportion of institutional share percentage of more than 90%. It meant that institutional shareholdings in some banking companies were very high and the supervision by institutional investors was also getting stronger. However, some banking companies were still indicated to apply earning management practices. The classification of companies of being indicated or not being indicated to apply earnings management practices were calculated through Eckel index.

A company must also implement the principles of good corporate governance in every business activity. Through some principles of good corporate governance (transparency, accountability, responsibility, independence, fairness and equality), it is expected that they can serve as a means of controlling the conflict of interest among owners and managers. Managers are not expected to prioritize personal interests, but they can run Corporate governance to minimize agency cost and earnings management. The results of this study reinforced the conclusion of research conducted by AlNajjar and Riahi-Belkaoui (2001), Saleh et al. (2005)

4.3.2. The Influence of Independent Board of Commissioners on Earnings Management

The second conclusion of the study also indicated the compatibility of sign. The number of independent board of commissioners influenced earnings management practices and the second hypothesis was also accepted The second hypothesis accepted indicates that the fewer number of independent board of commissioners, the circumstances might influenced the company to apply earnings management practices. The reduction of independent board of commissioners number was very influential on management control and increases the likelihood of fraud in the presentation of financial statements made by managers. The higher board of commissioners competence, the lower likelihood of fraud in presenting the financial statements.

The independent board of commissioners held an important and responsible role to oversee the quality of information in the financial statements. The role was very important because management had an interest in performing earnings management practices which would furtherly reduce investor confidence. Through its role in controlling function, independent board of commissioners might influence management in presenting the financial statements so that high quality earnings reports could be obtained.

A company with assets value of more than IDR 200,000,000,000 must have at least 1 person of independent board of commissioners and he must live in the Republic of Indonesia territory. The proportion of independent commissioners must be at least 30% of the total number of boards of commissioners in a company. Based on the sample, the total number of independent board of commissioners averaged more than 30%, and the proportion had been able to meet the regulatory requirements of the Financial Services Authority and the Capital Market Supervisory Board regarding independent board of commissioners.

PT. Bank ICB Bumiputera, Tbk (2011) and PT Bank Pembangunan Daerah Jawa Barat and Banten, Tbk (2014) had a proportion of independent board of directors of 80% of the total board of commissioners. However, the high proportion of independent board of commissioners was not a major factor determining the earnings management indication due to the proportion of independent board of directors 80% of PT. Bank ICB Bumiputera, Tbk (2011) indicated earnings management practices. Meanwhile, PT Bank Pembangunan Daerah Jawa Barat and Banten, Tbk (2014) owned 80% of independent board and it was not indicated to practices of earnings management.

The board of commissioners must also present a good report on the implementation of Good Corporate Governance and monitor its effectiveness as each company required to implement the principles of good corporate governance in every its business activity. Corporate governance is an attempt to minimize earnings management practices. The key to the success of corporate governance is building monitoring and

control system. The balance of supervision and control of the company's management will reduce the opportunity for managers to formulate policies based on personal interests and encourage the creation of transparency, accountability, responsibility, independence, and fairness. The results of the study supported research conclusions of Eakins (1990), Han et al. (1999), Handriani and Robiyanto (2019), Crane et al. (2016).

4.3.3. The Influence of Bonus Compensation on Earnings Management

The conclusions of this study indicated sign compatibility. The bonus compensation influenced earnings management and the third hypothesis was accepted. Acceptance of third hypothesis indicated that the more bonus compensation promised, it would increase the likelihood of the company to apply earnings management practices. Increasing amount of bonus compensation promised would likely increase the intention of managers to manage net income in order to maximize bonuses to be received.

Bonus compensation is a reward provided by the company to the manager. Directly or indirectly, bonus compensation affects the manager's performance. Of course, the performance appraisal system should first be enforced. Companies with compensate bonuses will encourage managers to increase the amount of earnings to get bonuses for their personal benefit. With the promised bonus compensation, management will strive to increase the company's profit in maximum level so the financial statements displayed will be better to get bonuses for their hard work. A good compensation system will be able to provide satisfaction for managers and enable companies to acquire, hire, and retain managers. With regard to improving the welfare of employees, an organization must effectively compensate according to the workload as it will also influence performance.

Based on the samples, most companies provided bonus compensation to improve manager's performance and competency in bonuses, benefits, remuneration, and in other facilities. From the mode of payment, bonus compensation can be provided in cash or non cash. The results of this study reinfoeced the conclusions of the study of Lewellen et al. (1987), Gaver and Gaver (1995), Chhaochharia and Grinstein (2009), Baum et al. (2004).

5. Conclusion, Implication, Suggestion, and Limitations

From this research, some conclusions formulated were:

1. Negatively, institutional ownership influenced earnings management practices. Therefore, the lower percentage of institutional ownership, the higher possibility to apply earnings management practices;
2. Negatively, independent board of commissioners influenced earnings management practices. Thus, the lower proportion of independent board of commissioners, the more likelihood to perform earnings management practices;
3. Positively, bonus compensation influenced earnings management practices. Therefore, the higher bonus compensation promised, the higher probability of applying earnings management practices.

This research still had some limitations. Factors that influence Earnings Management in this research only consisted of three variables, In fact, there are still some other proxy of Good Corporate Governance. Thus, the factors involved in this study were not sufficiently steady to predict which companies that are likely and indicated to apply earnings management practices. The method of sampling is only applied on the banking companies listed in Indonesia Stock Exchange.

Based on some of the limitations of this study, then the next research should add some variables that were considered to be a determinant of the company to apply earnings management practices. Further research was expected to select samples from big companies like property, industry, and mining to investigate e exactly the financial statements. Finally, further research was expected to use cross section and pooled data so that the resulted information could be more comprehensive.

References

[1] Adefemi, F., Hassan, A. & Fletcher, M. (2018). Corporate governance disclosure in Nigerian listed companies. *International Research Journal of Business Studies*, 11, 67-80.

[2] Al-Maskati, N., Bate, A. J. & Bhabra, G. S. (2015). Diversification, corporate governance and firm value in small markets: evidence from New Zealand. *Accounting & Finance*, 55, 627-657.

[3] Alnajjar, F. K. & Riahi-Belkaoui, A. (2001). Growth opportunities and earnings management. *Managerial Finance*, 27, 72-81.

[4] Ameer, R. (2010). The role of institutional investors in the inventory and cash management practices of firms in Asia. *Journal of Multinational Financial Management*, 20, 126-143.

[5] Baum, C. L., Saver, L. & Strickland, T. (2004). EVA, MVA and Compensation: Further Evidence. *American Business Review*, 22, 82-87.

[6] Beiner, S., Drobetz, W., Schmid, F. & Zimmermann, H. (2004). Is board size an independent corporate governance mechanism? *Kyklos*, 57, 327-356.

[7] Chhaochharia, V. & Grinstein, Y. (2009). CEO compensation and board structure. *Journal of Finance*, 64, 231-261.

[8] Cornett, M. M., Marcus, A. J., Saunders, A. & Tehranian, H. (2007). The impact of institutional ownership on corporate operating performance. *Journal of Banking & Finance*, 31, 1771-1794.

[9] Crane, A. D., Michenaud, S. & Weston, J. P. (2016). The effect of institutional ownership on payout policy: Evidence from index thresholds. *Review of Financial Studies*, 29, 1377-1408.

[10] Eakins, S. G. (1990). *The Role of Institutional Ownership in Reducing Agency Costs*. Dissertation, Arizona State University.

[11] Ernayani, R. & Robiyanto, R. (2016). The effect of the cash flows, gross profit and company size on Indonesian stock returns (a study on the chemical and basic industry companies during the periods of 2009-2014). *International Journal of Applied Business and Economic Research*, 14, 1697-1709.

[12] Gaver, J. J. & GAVER, K. M. (1995). Compensation policy and the investment opportunity set. *Financial management*, 24, 19-32.

[13] Han, K. C., Lee, S. H. & Suk, D. Y. (1999). Institutional Shareholder and Dividends. *Journal of Financial and Strategic Decisions*, 12, 53-62.

[14] Handriani, E. & Robiyanto, R. (2018a). Corporate Finance and Firm Value in The Indonesian Manufacturing Companies. *International Research Journal of Business Studies*, 11, 113-127.

[15] Handriani, E. & Robiyanto, R. (2018b). Investment Opportunity and Industrial Growth in Indonesia. *International Journal of Business and Society*, 19, 295-312.

[16] Handriani, E. & Robiyanto, R. (2019). Institutional ownership, independent board, board size, and firm performance: evidence from Indonesia. *Contaduría y Administración*, 64, e118.

[17] Hermiyetti & Malik, E. N. (2013). The Influence of Good Corporate Governance Mechanism on Earnings Management: Empirical Study in Indonesian Stock Exchange Listed Company for Periods of 2006-2010. *Indonesian Capital Market Review*, 5, 52-63.

[18] Jaffar, R., Aziendeh, R. R., Shukor, Z. A. & Rahman, M. R. C. A. (2018). Environmental Performance: Does Corporate Governance Matter? *Jurnal Pengurusan*, 52, 133-143.

[19] Jensen, M. C. & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3, 305-360.

[20] Lewellen, W., Loderer, C. & Martin, K. (1987). Executive compensation and executive incentive problems: An empirical analysis. *Journal of Accounting and Economics*, 9, 287-310.

[21] Mohammadi, S. & Nezhad, B. M. (2015). The role of disclosure and transparency in financial reporting. *International Journal of*

Accounting and Economics Studies, 3, 60-62.
[22] Purwanti, D. & Natser, G. I. (2016). Influence of the Quality of Accrual Financial Report Information with the Roles of Accounting Information System as an Intervening Factor. *Jurnal Dinamika Akuntansi*, 8, 84-97.
[23] Puspitaningrum, D. & Atmini, S. (2012). Corporate Governance Mechanism and the Level of Internet Financial Reporting: Evidence from Indonesian Companies. *Procedia Economics and Finance*, 2, 157-166.
[24] Saleh, N. M., Iskandar, T. M. & Rahmat, M. M. (2005). Earnings Management and Board Characteristics: Evidence from Malaysia. *Jurnal Pengurusan*, 24, 77-103.
[25] Smith, C. W. & Watts, R. L. (1992). The investment opportunity set and corporate financing, dividend, and compensation policies. *Journal of Financial Economics*, 32, 263-292.
[26] Tong, S. & Junarsin, E. (2013). Do Private Firms Outperform SOE Firms after Going Public in China Given their Different Governance Characteristics? *Gadjah Mada International Journal of Business*, 15, 133-170.
[27] Tuan, N. V. & Tuan, N. A. (2016). Corporate Governance Structures And Performance Of Firms In Asian Markets: A Comparative Analysis Between Singapore And Vietnam. *Organizations and Markets in Emerging Economies*, 7, 112-140.
[28] Utama, C. A. & Musa, H. (2011). The Causality between Corporate Governance Practice and Bank Performance: Empirical Evidence from Indonesia. *Gadjah Mada International Journal of Business*, 13, 227-247.

Examining the Quality of Audit Committee Work: An Empirical Examination of the Determinants of Audit Committee Diligence in the UAE

Amer QASIM

College of Business, Al Ain University, UAE
E-mail: amer.qasim@aau.ac.ae

Abstract

This study seeks to examine the main determinants of audit committee diligence of companies listed in the UAE. Following prior literature, audit committee diligence reflects audit committee work quality and is proxied by the number of meetings. Multivariate analysis is used to examine the relationship between certain corporate characteristics and number of meetings. Results showed that company size and financial expertise of AC members have positive significant impact on audit committee diligence. On the other hand, other variables such as firm leverage, firm profitability, and audit committee size seemed to have no significant relationship with audit committee diligence.

Keywords: *corporate governance; audit committee, diligence of audit committee.*

1. Introduction

Recent years have witnessed increasing attentions toward the need to strengthening corporate governance mechanisms of companies listed in financial markets (Mcmullen, 1996; Abbott, 2000; Beasley et al, 2001; Dezoort and Salterio, 2001; Daily et al, 2003; Beasley and Saltiro, 2009). This has been a response of global corporate financial scandals and management corruptions (Daily et al, 2003; Malik, 2014). Corporate governance is viewed as an essential mechanism to protect the interests of shareholders (Fama and Jensen, 1983). One of the main themes of corporate governance is that companies are governed by designated board committees (Abbott and Parker, 2000; Daily et al, 2003; Spira, 2003). Formulating committees allow the board of directors to delegate responsibility for specific duties (Spira and Bender, 2004), thus assisting it to carry out its responsibilities more efficiently and effectively (Jiraporn et al., 2009). In this matter, Reeb and Upadhyay (2010) explained that board committees help corporate boards to accomplish more effective decision making by distributing responsibilities and tasks among board members, thereby avoiding the coordination and communication difficulties/costs associated with bringing the full board together, especially if the board is large. Such is the perceived importance of these committees, Chen and Wu (2016) go further more to argue that most board activity actually takes place in committee meetings, rather than in board meetings. The UAE CG Code (2010) also acknowledges their value in its stipulation that all companies listed in the UAE financial markets should set up at least three committees to assist the board of directors in performing its tasks and responsibilities. These committees should include, at least, an Audit Committee, a risk management committee, and an appointment and remuneration committee.

Audit committee (AC) is considered as one of the most important building blocks of corporate governance (Kan et al, 2011; Qasim, 2018). In this regard, researchers indicated that an effective AC plays a significant role in enhancing the quality of financial reporting, reliable internal controls, and shareholders' protection from any fraudulent accounting practices (Dezoort, et al., 2002, Qasim, 2014). However, AC effectiveness is conditional to some determinants (Mcmullen, 1996). One of which is the diligence of AC. In several occasions, officials representing private and public market regulators highlighted the significance of having a diligent AC (Raghunandan and Rama, 2007). Hornby (2010, p. 407) defines diligence as being careful and thorough in one's work or efforts. The diligence of AC members is crucial in ensuring that the committee performs its responsibilities effectively and with integrity (Sharma et al., 2009). Previous studies have highlighted the positive link between AC diligence and committee effectiveness (e.g. Elijah and Ayemere, 2015) and between AC diligence and improved CG practice in general (Thiruvadi, 2012), with specific associations being demonstrated between committee diligence and characteristics such as financial expertise (Braswell et al., 2012).

Diligence of audit committees has been viewed as important because it is believed that it will lead to increased quality of the intended roles of AC (Stewart and Munro, 2007). Although the origins of corporate governance reforms started in developed countries, countries with ambitious plans to strengthen their financial markets have recently moved toward implementing similar code of conducts (Al Jifri, et al., 2014, Qasim, 2018). This study extends prior literature in this area by considering a new setting, the UAE. In 2010 the UAE took serious steps to oblige listed companies to a new corporate governance code of conduct. According to this code, listed companies are forced to form at least three committees; risk committee, remuneration committee, and audit committee (Qasim, 2018). This study focuses on audit committees. In particular, the main objective of this study is to examine the determinants of audit committee diligence of companies listed in the UAE financial markets. Up to the current researcher knowledge, no study is conducted in the UAE context in this research area. The current study aims at filling this gap.

2. The development of corporate governance guidelines in the UAE

Corporate Governance has been regulated in the UAE through a number of years by the UAE Securities and Commodities Authority (SCA). In early 2007, the SCA introduced the UAE code of corporate governance (SCA Decision R/32 of 2007). The code detailed the corporate governance requirements that companies should comply with. According to the code, listed companies are required to include in their annual reports a "corporate governance report" which should contain information about Board Structure and Directors duties and liabilities. Also, the corporate governance report should outline information about board committees, Directors' remuneration, internal control, risk management, and the external auditor. In October 2009, a new code concerning Corporate Governance was issued by the UAE Ministry of Economy which amended the old code. The ministerial resolution No. 518 of 2009 refined, clarified, and updated the old code and made it clear that corporate governance disclosures are mandatory on companies listed in the UAE securities market. In this regard, Companies listed in the UAE securities market were given a grace period of three years starting from 2007 to comply with the code (no later than 30 April 2010).

The new code places more emphasis on oversight of the management and functions of the board of directors by appointing more independent members and non-executive directors, forming committees and having external auditor who is neutral and independent to companies activities. Going beyond what is required by the previous Code, the External auditor is prohibited to perform any technical, administrative or consultation services or any services that may affect its independence. The duties of directors have been further enhanced in accordance with international standards. According to the code, the position of chairman of the board of directors and managing director should not be held by the same person different individuals. Also, the existence of non-executive directors has been increased and as a requirement, the board of any company should at least setup an audit committee, a nomination committee and remuneration committee. The audit, nomination and remuneration committees must comprise of not less than three non-executive directors, of whom at least two members shall be independent members and shall be chaired by either independent members. In this regard, these committees are entitled to submit written reports to ensure greater transparency of the procedures, results and recommendations that the committee reaches.

In Addition, the new code also requires listed companies to have a code of conduct along with other corporate internal policies and standards. It requires the board of directors to establish a specific internal control system, to assess risk management and ensure a thorough execution of the governance rules. Most importantly, the new code also requires listed companies to apply environmental and social policies requiring greater corporate social responsibility.

3. Theoretical Framework and model development

Stemming from an agency theory point of view, certain characteristics may trigger the need for increased monitoring mechanisms (Jensen and Meckling, 1976). This study argues that one of the mechanisms for increasing monitoring is a diligent audit committee (Abbott, 2000). In this regard prior research recognized diligence as a measure of an effective audit committee (Yin et al, 2012). Many researchers argued that a diligent audit committee would minimize the chance of financial frauds and improve the quality of financial reporting (Beasley, 1996; McMullen and Raghunandam, 1996; Abbott et al., 2004; Pucheta-Mart´ınez and De Fuentes, 2007). Moreover, the importance of having diligent corporate audit committees has been stressed by many regulatory authorities (e.g. the US Securities and Exchange Commission; Sarbanes-Oxley Act, 2002).

According to Yin. Et al. (2012) measuring diligence is not straightforward. Diligence has been described in the literature as the level of preparation and activity of the audit committee chair and other members.

Prior literature identified ***Size*** as one of mostly examined variable in this research area. Larger companies are expected to increase their monitoring mechanisms and hence strengthening internal and external auditing systems. Based on that it is believed that larger companies are expected to have more AC meetings. In addition, companies with greater debt ratio are expected to commit fraud. As a result, it is expected that ***leverage*** is positively associated with AC meetings. Also, corporate fraud is most likely to take place in poorly performed companies. So, ***Profitability*** is expected to have a positive relationship with AC number of meetings. ***Financial Expertise*** of AC members has been also perceived by prior literature to have a positive influence of the effectiveness of audit committees. Prior investigations suggest that financial expertise of AC members improves the quality of financial statements. Researchers indicated that the presence of financial experts in AC will give more chance to follow up technical financial reporting issues which, as a result, might lead to more meeting frequency.

According to the above discussion, the following hypotheses are developed:

H1: AC diligence is positively associated with firm size;
H2: AC diligence is positively associated with firm leverage;
H3: AC diligence is positively associated with firm profitability;
H4: AC diligence is positively associated with AC members' financial expertise;
H5: AC diligence is positively associated with AC Size.

4. Methodology of the study

To test the hypotheses of the study, the following multivariate model is adopted:

$$AC\ Diligence = \alpha + \beta 1\ Size + \beta 2\ Debt + \beta 3\ Profitability + + \beta 4\ AC\ FinExp + \beta 5\ AC\ Size$$

Whereas:

AC Diligence = number of audit committee meetings during 2017,

Size = Firm average market capitalization for 2017,

Debt = firm's leverage ratio for 2017 calculated as Total debt / Total assets,

Profitability = firms disclosed ROE for 2017,

AC FinExp = number of members in the audit committee who have financial experience,

AC Size = number of members in the AC.

Data were collected from the 2017 annual reports of companies listed in the Abu Dhabi Stock Exchange (ADX) and Dubai Financial Market (DFM). According to the 2017 databases of ADX and DFM the total number of listed and traded companies is 76 in both financial markets. However, 12 companies were eliminated from the study due to the following reasons:

- 7 companies did not disclose audit committee meeting frequency;
- 5 companies with uncomplete data

Eventually a total number of 64 companies are included in the study.

5. Results and Conclusions

To test the research hypotheses, ordinary least squares (OLS) regression model is used. Table 1 below shows descriptive statistics of the variables included in the study. As seen in the table, variables (audit committee size, audit committee number of meetings, and audit committee financial expertise)

vary among firms. Even though, the UAE corporate governance code required companies to adhere to certain requirements for audit committee members and meetings, it is noticed that some firms voluntarily go beyond what is required. For example, size of audit committees ranges from 3 members to 5 members (the code requires 3 members). It is also interesting to see that some Audit Committees held up to 12 meetings per year (The UAE code suggest a minimum of 4 meetings per year).

Variable	Min	Max	Mean	Median	Standard Deviation
AC meet	4	12	4.875	4	1.695
Size	1552101	74179256000	4441997200	1210916866	12248841251
Debt	0.10	.55	.4162	.4320	.2021
Prof	-.1059	.3542	.1056	.0466	.1938
Ac FinExp	1	4	1.875	2	.9172
AC Size	3	5	3.250	3	.5345

Table 1. Results of the Descriptive analysis (N = 64)

Table 2 reports the estimated regression coefficients for the OLS regression model. The variance inflation factors (VIF) are reported in the table, the highest VIF scores reported is 1.479 which means that the problem of multicollinearity is not present (Gujarati, 2004). As seen in the table the model is significant in explaining the relationship between the examined variables and the dependent variable at the 0.001 significance level.

Model statistics	F Value	3.287
	P- Value	.004
	Adj. R^2	.223
	DW	1.764

Independent variables	B	P-value	VIF
constant		.005	
Size	.239	**.051***	1.348
Debt	.109	.349	1.075
Prof	.177	.176	1.168
AC FinExp	.232	**.091***	1.479
AC Size	.062	.625	1.286

Table 2. Results of the OLS Model

The results of the OLS model in table (2) show that two variables have significant influence on the dependent variable (AC meetings). Consistent with the findings of Menon and Williams (1994), Raghunandan and Rama (2007) and Me´ndez and Garc´ıa (2007), firm size is positively associated with the number of audit committee meetings. Also, AC financial expertise is found to have a significant positive relationship with AC meetings contradicting the results reported by Yin (2012) where no relationship was fount between the two variables. Based on that it can be said that audit committee diligence is positive in larger companies and in companies with AC member with financial expertise. Accordingly, hypotheses H1 and H4 are supported. On the other hand, H2, H3, and H5 are rejected. These results are consistent with the findings reported by Raghunandan and Rama (2007).

This study has contributed to the literature from at least one important perspective. The study provides empirical evidence on the determinants of audit committee meeting frequency in UAE. As previous studies were exclusively based on data from developed economies, the present study that has used the data from the largest developing country extends our understanding of key determinants of audit committee meeting frequency. UAE has recently developed and introduced a comprehensive set of corporate governance guidelines and companies obliged to disclose the number of audit committee meetings. Our study adds to the research on the determinants of audit committee meeting frequency in a developing country setting. However, in order to get better understanding of this research area, it is recommended to increase sample of the study by conducting a comparative study covering listed companies from countries in different regions. Also, it is suggested to conduct qualitative research examining the perception and attitudes of corporate stakeholders regarding audit committee function in general and audit committee diligence in particular

References

[1] Abbott, L. and Parker, S. (2000). Auditor Selection and Audit Committee Characteristics. *Auditing: A Journal of Practice & Theory*, 19(2), pp. 47-66.

[2] Aljifri, K., Alzarouni, A., Ng, C. and Tahir, M. (2014). The Association between Firm Characteristics and Corporate Financial Disclosures: Evidence from UAE Companies. *International Journal of Business and Finance Research*, 8(2), pp. 101-123.

[3] Beasley, M. and Salterio, S. (2001). The Relationship between Board Characteristics and Voluntary Improvements in Audit Committee Composition and Experience. *Contemporary Accounting Research*, 18(4), pp. 539-570.

[4] Beasley, M., Carcello, J., Hermanson, D. and Neal, T. (2009). The Audit Committee Oversight Process. *Contemporary Accounting Research*, 26(1), pp. 65-122.

[5] Daily C. Dalton, D. and Cannella, A. (2003). Corporate Governance: Decades of Dialogue and Data. *Academy of Managerial Review*, 28 (3), pp. 371-382.

[6] DeZoort, F., and Salterio, S. (2001). The Effects of Corporate Governance Experience and Financial Reporting and Audit Knowledge on Audit Committee Members' Judgments. *Auditing: A Journal of Practice & Theory*, 20(2), pp. 31-47.

[7] DeZoort, F., Hermanson, D., Archambeault, D. and Reed, S. (2002). Audit Committee Effectiveness: a Synthesis of the Empirical Audit Committee Literature. *Journal of Accounting Literature*, 21, pp. 38-75.

[8] Elijah, A. and Ayemere, I.L. (2015). Audit committee attributes and earnings management: Evidence from Nigeria. *International Journal of Business and Social Research*, 5 (4), pp. 14-23.

[9] Gendron, Y., Be´dard, J. and Gosselin, M. (2004). Getting Inside the Black Box: A Field Study of Practices in "Effective" Audit Committees. *Auditing: A Journal of Practice & Theory*, 23(1), pp. 153-171.

[10] Gendron, Y. and Bédard, J. (2006). On the Constitution of Audit Committee Effectiveness. *Accounting, Organizations and Society*, 31(3), pp. 211-239.

[11] Hornby, A. S. (2010). *Oxford Advanced Learner's Dictionary of Current English*. 7th ed. Oxford: Oxford University Press

[12] Jensen, M. C., Meckling, W. (1976). Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics*, 3, pp. 305-360.

[13] Kang, W., Kilgore, A. and Wright, S. (2011). The effectiveness of Audit Committees for Low-and Mid-Cap Firms. *Managerial Auditing Journal*, 26(7), pp. 623-650.

[14] Klein, A. (2002). Audit Committee, Board of Director Characteristics, and Earnings Management. *Journal of Accounting and Economics*, 33(3), pp. 375-400.

[15] Malik, M. (2014). Audit Committee Composition and Effectiveness: A Review of Post-SOX Literature. *Journal of Management Control*, 25(2), pp. 81-117.

[16] McMullen, D. (1996). Audit Committee Performance An Investigation of the Consequences Associated with Audit Committees. *Auditing: A Journal of Practice & Theory*, 15(1), pp. 87-103.

[17] Qasim, A. (2014). The Impact of Corporate Governance on Firm Performance: Evidence from the UAE. *European Journal of Business and Management*. 6 (2), pp. 118-124.

[18] Qasim, A. (2018). Audit Committee Effectiveness: Reflections from the UAE. *International Journal of Economics and Business Research*. 15 (1). Pp. 87-107.

[19] Raghunandan, K., and Rama, D. (2007). Determinants of Audit Committee Diligence. *Accounting Horizons*, 21(3), pp. 265-279.

[20] Sharma, V., Naiker, V., & Lee, B. (2009). Determinants of audit committee meeting frequency: Evidence from a voluntary governance system. *Accounting Horizons*, 23 (3), pp. 245-263.

[21] Shleifer, A. and Vishny, R. (1997). A Survey of Corporate Governance. *Journal of Finance*, 52 (2), pp. 737-748.

[22] Spira, L. (2003). Audit Committees: Begging the Question? *Corporate Governance*, 11(3), pp. 180-188.

[23] Stewart, J. and Munro, L. (2007). The Impact of Audit Committee Existence and Audit Committee Meeting Frequency on the External Audit: Perceptions of Australian Auditors. *International Journal of Auditing*, 11(1), pp. 51-69.

[24] Thiruvadi, S., 2012. Gender differences and audit committee diligence. *Gender in Management: An International Journal*, 27 (6), pp. 366-379.

An Overview of Performance Management in Romanian Public Administration

Stefania Cristina MIRICA [1], Liliana Mihaela MOGA [1*], Andreea Elena MATIC [1], Bucur Iulian DEDIU [1]

[1]Dunarea de Jos University of Galati, 47 Domneasca Street, Galati, 800008, Romania
E-mail addresses: stefania_mirica@yahoo.com; liliana.moga@gmail.com; amiricass@yahoo.co.uk; dediubucuriulian@yahoo.com
[*]Corresponding author, E-mail: liliana.moga@gmail.com

Abstract

Evaluating the performance of management in public administration is becoming a theme more and more discussed by both researchers and practitioners, once recognition of the need to reform the system. The reforms start from a state of things, which must be evaluated through a system of quantitative and qualitative indicators, so that, based on the situation found, the decisions regarding the changes that have to be made are taken. The research is focused on identifying the trends in the management performance evaluation in public institutions, at international level, by reviewing the literature and political documents. In the second part of the research, it is analyzed whether these trends are found in the public administration in Romania. The positive changes are highlighted in approaching the need to evaluate the public institutions activity, both at research level, and in practice and in updating current legislation.

Keywords: *performance management; evaluation; public administration; reform; corporation; citizens; new public management.*

1. Introduction

The public sector is governed by a complex system of institutions that are connected among them, which makes the activity hard to evaluate. Evaluating the public administration management requires a fundamental transformation of the importance given to the relationship between the government, the public administration and the citizens. (Summary Report of Public Sector Governance Evaluation, 2013). The evaluations carried out at the level of government agencies pursue to analyze the degree of managerial and political accountability, the efficiency level of activities, the level of public spending, by relating in absolute and relative amounts to national GDP, the quality and quantity of public services (Boston, 2000). The critics of reforms in public administration tend to ignore the inclusion of economic and financial indicators, while proponents of reforms tend to attach little importance to introducing indicators that measure the broad implications of reforms at political, social and ethical level.

As concerns the management evaluation in corporations, the researchers' concerns were expressed in practical proposals for models and indicators. Guerra-López (2018) states the principles of performance-based evaluation for private organization and introduces customized models. Hoque (2004) investigates determinants and consequences of performance measures. The research investigates the role of the choice of performance measures on the relationship between strategic priorities and performance. Grafton, Lillis and Widener (2010) conducted a study on the role of performance measurement and evaluation in building organizational capabilities and performance.

In public administration it is necessary to be performed rundowns in order to identify the problems and the relevant foundation of the solutions for simplifying the activity. As long as in the public sector competition is excluded, it will be perpetuated a system in which there are negative upshots on the quality of services offered by public institutions, respectively high costs necessary for backing them up. It is recommended that, in order to analyze the performance of a public institution, to establish a link between results, means and objectives, so that there is also an approach as concerns the effectiveness, efficiency and costs, concepts that characterize the corporate environment (Profiroiu, 2001). A report by the United Nations Development Program (OECD, 2005) identifies the essential part played by the openness to new ideas, in order to achieve a constant progress and higher accomplishments. The new public management outlines a new approach to the content of the mission of the public institution and recommends interlacing in a balanced manner, the values and aspirations common to all public institutions, as well as the specific ones reckoned by the representatives of public management as essential in the relationship with the beneficiaries of products and services. (Plumb and Androniceanu, 2003).

2. Evaluation of the activity of corporations versus evaluation of public institutions activity

The role of public institutions is to provide the highest quality public products and services, natural and legal persons, in order to satisfy the general and specific social needs in conditions of economic efficiency (Plumb and Androniceanu, 2003). The mission of a public institution consists in applying the normative acts in force, and the purpose is to ensure the resolution of social problems, regardless of the cost involved. Starting from the mission, for a long time, it has been considered that in the public sector it cannot be applied the concept of performance, which is specific to corporations. On the other hand, the general functions of management are also found in public management, since in public institutions, as well as in corporations, goals

must be reached, missions accomplished, certain performances achieved. Success in the activity of public authorities and institutions means the application of the same fundamental principles of organizing the activity in an efficient manner. Lead and Androniceanu (2003) emphasize that the thinking of public managers must be laid somewhere on the border between social logic and competitive logic, where social logic is based on the fact that any initiative of the public management representatives, as regards the quantity and quality of the services provided, it must be determined by the general public interest and the orientation entirely towards its satisfaction. The elements of this logic are called performance criteria and are expressed by economy, efficiency and effectiveness.

The performance measurement in corporations is generally carried out by analyzing a system made up of financial indicators, which includes productivity, profitableness and profit, indicators that cannot be calculated in the case of public institutions. As you can see, this system is composed of result indicators, being designed for the private segment, which targets to maximize profit by lowering costs. The profit is the one that runs the economic activity, the managers of the corporations avoid to hire a large number of employees, out of the desire to control the expenses with the salaries, the important component in the total expenses of a corporation. A major difference between the activity of public institutions and that of corporations, which is reflected in the manner of evaluation, is that the lack of motivation by profit in public organizations lays emphasis on the indicators that compose the evaluation system of the public institutions activity. Public organizations are evaluated from the perspective of providing specific services or problem solving. The beneficiaries of public services know few details about the costs of a public service but, instead, they can recognize and complain about the quality, quantity and duration of a public service. The connection between organizational citizenship behavior and performance judgments was investigated by Allen and Rush (1998). In public institutions, there is the opinion that a larger number of employees make more efficient the accomplishment of the job duties (Mora, 1999). The lack of financial motivation or of making a profit in the public institution may have the effect of decreasing the performance and the interest towards it, and the evaluation of its activity becomes relatively difficult.

Regarding the evaluation of budgetary system, respectively the activity of public institutions, there is a current focused on the non-financial measures, which are not related to profit, but are related to the goals assumed, whose fulfillment must lead to an improvement in the performance. The performance of a public organization is determined depending on the way in which the human, material, informational and financial resources are used to achieve the proposed goals at the level of the expectations of the beneficiaries of services. Decreasing bureaucracy and simplifying procedures for citizens, business environment and public administration are measures intended for making more efficient the public administration activity (from the perspective of costs and reaction time), as well as increasing the degree of transparency and integrity in the provision of services, which can contribute to a higher satisfaction of the citizen, as the final beneficiary of the activities undertaken by the public administration and to an improvement in the perception of the public administration.

Contrary to the situation in the private sector, the accuracy of public services must take into account social protection, equal opportunities, equitableness and the proper distribution of public goods among all citizens. Research suggests the use of these criteria for determining efficiency and effectiveness, given that the New Public Management promotes the use of a market-oriented approach, mirroring the private environment (Rhodes, 1987). Following the broad acceptance of the new public management, the interest in employing indicators for measuring the performance used in companies has increased, by adapting them to the specific nature of the public sector. (Carter, 1989).

3. Evaluation of the institutions activity by focusing on the citizen

The public administration modernization requires adaptations or even radical changes of the management used, in the context in which most administrations tend to oppose the change. It is accepted that public services are intended to satisfy the interests of the citizens, as final beneficiaries, "but this does not mean that every citizen has a right of claim to the public service in order to demand its provision; the citizen can take advantage of the public service to the extent allowed by law " (Negulescu, 1925). In Strategy 2020: Empowered Citizens, an Accountable Europe it is reiterated the priority role of the services beneficiaries in the development of the administration (Transparency International EU, 2016). In Romania, the guidance is taken over and updated in the Strategy for Strengthening Public Administration 2014-2020 (Romanian Government, 2014). Through the reform promoted in the public administration it is aimed at adapting to changes in the world economy and to the requirements imposed by Romania's integration into the European Union. The need to find solutions for reinventing the public administration, by replacing the bureaucracy with the collaboration with the external environment and their beneficiaries, underlies the introduction of eGovernment. At the same time, it is promoted a new approach, through which it is replaced the classic approach oriented towards service provider institutions, focused on the needs of the beneficiaries – citizens and the business environment, focused on the so-called life events. Even if less directly, this approach will also have beneficial effects on society as a whole, by increasing the capacity of the public administration to provide quality services, to generate, manage and promote change for the purpose of development, to treat its beneficiaries more as partners than as contributors and to respond with solutions adequate not only for punctual problems, but also to system problems. Decreasing bureaucracy and simplifying procedures for citizens, business environment and public administration are measures intended for making more efficient the public administration activity (from the perspective of costs and reaction time), as well as increasing the degree of transparency and integrity in the provision of services, which can contribute to a higher satisfaction of the citizen, as the final beneficiary of the activities undertaken by the public administration and to an improvement in the perception of the public administration.

In order to prove their efficiency, the mentioned aspects need to be supplemented with the improvement of internal processes at the public institution level so that the organizational structure and internal procedures ensure both the unit of approach by category of institutions and the flexibility and adaptation to new situations, generated by the changing needs of the citizens. In this context, it was considered necessary to stimulate the implementation of management standards in the public administration and to increase the capacity of the internal audit structures, whose recommendations are essential for increasing the performance in the public institutions.

4. Trends in the evolution of practice and management in the Romanian public administration

The process of preparing Romania's accession to the European Union required the improvement of the Romanian public administration by implementing reforms through which the public sector to adapt to the requirements imposed by the changes that take place in the economic and social environment, during a period when, at international level, it is considered that the public administration is an essential factor that determines the competitive advantage of a nation, and the activity of the public administration in Romania is subject to

criticism and discontentment for both citizens and international partners (Profiroiu, 2002). The pre-accession period, for the public administration, brought many changes and improvements, but initially the reforms were established and implemented for specific situations, without existing a national strategy, which would be doubled by a general conception of the reform in public administration, at national level.

Starting the implementation of the strategic reform of public administration was materialized by the adoption of GD No. 951/2001, based on which the Governmental Council for Monitoring the Public Administration Reform and the Central Unit for the Public Administration Reform was set up, whose main objective is the monitoring of the way of enforcement of the provisions included in the strategies and programs of reform in the public administration (Government of Romania, 2001; a).

Given that a reform in the public administration cannot be achieved without introducing the methods specific to the information and communications technology, the Government of Romania (2001; b) has elaborated the Strategy regarding the computerization of the public administration, among which are listed the following actions:

- computerization for increasing efficiency in central and local public administration;
- computerization of services, having as beneficiaries citizens and economic agents;
- ensuring the access of information through information technologies for the end-users of central public administration services (Romanian Government, 2001; b).

In 2001, The Romanian Government approved the organization and functioning of the National Regulatory Authority for Public Services of Communal Household, as a specialized body of the central public administration. The Agency develops and applies the system of regulations concerning the organization and functioning of the public services sector of the communal household and of the market of these services in terms of efficiency, free competition, and transparency for satisfying the needs of the users according to the European standards.

In order to bring the administration closer to the citizen, a goal included in the Romanian Governance Program starting with 2001, it has as essential elements the decentralization and deconcentration of services, an increase in the decision-making autonomy and the debirocratization and the access to the information of public interest. In this respect, there have been created and adopted the following normative acts regulating the free access to public interest information, regulating one of the fundamental principles of the relations between persons and public authorities, as well as normative acts regulating the activity of solving the petitions, being created for the first time the possibility for natural persons and legally established organizations to address petitions to public authorities and institutions sent also by e-mail.

In 2001, the first strategy on accelerating the reform of the public administration was developed, which mentions the purpose of the reform in the public administration in Romania, as being, at a general level “to determine the nature of the problems existing in its various fields, to propose the optimal solutions and to describe the principles for its implementation ", respectively, at local level "to create administrations capable of carrying out their functions in such a way as to prepare the conditions and to ensure the economic, social and organizational development in a certain space. In the process of building the reform strategy in the public administration, there have been taken into account principles that reflect the influence of the principles promoted by the public management, some inspired by the new public management, respectively” (Government of Romania, 2001; c):

- “separation of political functions from administrative ones;
- creation and strengthening of a body of career civil servants, professional and politically neutral;
- clear definition of the role, responsibilities and relationships among institutions;
- legitimacy and correct administration; law-based administration must ensure adequate and proper procedures, respect for the social values, rights and freedoms of citizens;
- making decisions by the authorities closest to the citizens or the problem to which they refer;
- decision-making autonomy;
- transparency of the governing act and the other administrative acts, which will enable the participants to follow the administrative processes and to obtain information regarding their rights in the relations with the public sector;
- simplifying the administrative procedures;
- respect for the citizen;
- delegation of competences and decentralization of services;
- orientation towards results based on efficiency, effectiveness and quality of services".

The vision of the reform process in the public administration is based on a large modernization process and targets at an objective evaluation of important aspects, out of which we mention the analysis of the social effectiveness of the specific activity of the public administration.

Efficiency and effectiveness improve when the involvement of civil servants grows, when responsibilities are transferred to the lower levels of the administration, along with establishing the system of responsibilities, at each level.

The last integrating strategy for public administration was developed in Romania in 2007, although central public administration institutions had several initiatives that approached aspects of public administration reform, but in a fragmented manner and without highlighting the causes that affect the efficient functioning of the public institutions. Considering the experience acquired and the problems arising during the reform implementation in the public administration, it appeared the requirement of updating the previous strategies, which led to the adoption of the Strategy for the consolidation of the public administration 2014 - 2020, which had the purpose of establishing the general framework of the public administration reform (Romanian Government, 2014).

Although progresses have been made, the Romanian public administration has a number of shortcomings, mainly as concerns efficiency and effectiveness. The reduced concern with the real impact of the results obtained on the beneficiaries of public services and the insufficient collaboration with the partners (academic environment, business, civil society, relevant social partners) within the decision-making process generates a certain degree of distrust between officials and citizens, on the one hand, as well as between officials and policy makers on the other hand.

Romania has received financial support from the European Union in order to enhance the administrative capacity, reduce bureaucracy, increase the degree of transparency and professionalization of the administration, as well as grow the efficiency of using public funds. In the context of the negotiations with the European Commission on the subject of Partnership Agreement, which underlies the non-reimbursable financing out of structural funds for the period 2014-2020, there is an increasing concern for the public administration modernization and the creation of the capacity required to fulfill the role of facilitator of the social and economic development of Romania.

The overall goals proposed by the Strategy for the consolidation of the public administration 2014-2020 (Government of Romania, 2014), which touch on aspects specific of the new management, are:

- adapting the structure and mandate of public adminis-

tration to the needs of citizens and to the real financing possibilities by reallocating the mandates of central and local public administration, by clearly delimiting the role, functions and competences exercised by them is essential to ensure a climate of predictability, stability and efficiency of the public administration activity. This involves an integrated approach at the level of the whole public administration and a better allocation of resources which has as purpose to increase the public administration efficiency in general.

- the implementation of an efficient management in the public administration represents an essential condition for carrying out the present and future reforms, being necessary a coherent and coordinated approach of the aspects regarding the decision-making process, human resources, information technology, internal processes, quality assurance and research and innovation as premises of the future development.

A new approach, oriented to the needs of the beneficiaries of public services – citizens and business environment, replaces the classic approach, oriented to the institutions providing public services. In time, the society members, as the main beneficiaries of the public services, will recognize the positive changes, due to the increase of the public administration capacity to provide quality services, to treat the services beneficiaries as partners and not as some contributors and to respond with adequate solutions not only to punctual problems, but also to system problems. The proposed changes must be supplemented by the improvement of internal processes at the level of public institutions, so that the organizational structure and internal procedures be accordingly sized and defined, so as to ensure both the unit of approach by category of institutions and the flexibility and adaptation to new situations. The implementation of a performance management pursues not only to manage the present situation, but also to anticipate future situations and to follow the trends in the field (Government of Romania, 2014).

The continuation of the reform in the field of local public administration aimed at the *decentralization process* through actions of deconcentration of the decision and of the administrative action both at the level of the central administration and at the level of the specialized directions within the administrative-territorial units. It has been a permanent pursuit of a higher awareness and involvement of local collectivities in managing regional and local issues. The law of the local public administration that regulates the general regime of local autonomy, defines the duties and competences of the local authorities and strengthens the responsibility of the local elected to the citizen (Parliament of Romania, 2015).

5. Conclusions

The public administration cannot be reformed in a short time, being a long-term process, which must be implemented in a complex environment that is constantly changing. The concern for carrying out the public administration reform is due to the need to develop and strengthen the capacity of public administration authorities to the highest standards, with the purpose of increasing the quality of public services and access to them. The reform of the public sector concerns both structural and procedural aspects in order to contribute to social change. This process aims to develop a modern and efficient system of public administration, whose functioning principles to correspond to the most advanced European practices, being necessary a strategy for sustainable social change and for redefining the role that the state has as a promoter of democracy and market economy. In the success of the public administration reform, it is necessary to found its concepts and to clearly establish the role, responsibilities, duties, expected results of the activity of public administration authorities.

In the last decades, the public administration has had to keep up with the evolution of society and respond to higher demands, and the scientific organization and continuous improvement of the activity and structures, as well as the efficient use of all resources, to lead to obtaining maximum results with minimum efforts. From the analysis of the trends shown in the public administration evolution, it was find that, at international level, it has been accepted that an important part in the modernization of the management is played by the evaluation of the system. The evolution of the management applied in the public organizations converges towards the acceptance of the following guidance in the public administration management: the introduction of modern management techniques, the evaluation of efficiency and effectiveness, the concentration on the satisfaction of the public services end user – the citizen, as a representative of the community and the introduction of the performance indicators for measuring the degree of achievement of the goals.

Concerning Romania, it is found that the accession to the European Union has required the improvement of the public administration by implementing certain reforms through which the public sector to adapt the to the requirements imposed by the European Union. The start of implementing the strategic reform of the public administration was materialized by a number of endeavors, including at political and strategic levels, which led to the alignment of the public institutions activity with the international trends, including as concerns the evaluation of public services.

References

[1] Allen, T.D., Rush, M.C. (1998). The effects of organizational citizenship behavior on performance judgments: A field study and a laboratory experiment, *Journal of Applied Psychology*, 83(2), 247-260.

[2] Boston, J. (2000). The challenge of evaluating systemic change: the case of public management reform. *International Public Management Journal*, 3, 23-46.

[3] Carter, N. (1989). Performance indicators: “backseat driving” or “hands off” control? *Policy and Politics*, 17, 131-138.

[4] Grafton, J., Lillis, AM, Widener S.K. (2010). The role of performance measurement and evaluation in building organizational capabilities and performance, *Accounting, Organizations and Society*, 35(7), 689-706.

[5] Guerra-López, J.I. (2008). *Performance Evaluation: Proven Approaches for Improving Program and Organizational Performance*, John Wiley & Sons.

[6] Hoque, Z. (2004). A contingency model of the association between strategy, environmental uncertainty and performance measurement: impact on organizational performance, *International Business Review*, 13(4), 485-502.

[7] Mora, C. (1999). Issues regarding the Human resorces management in public administration (Aspecte ale managementului resurselor umane în sectorul public), *Transylvanian Review of Administrative Sciences*, 1(2), 129-135.

[8] Negulescu, P. (1925). *Treaty of Administrative Law* (*Tratat de drept administrativ*), vol. I, The Ist Book, The IIIrd Edition, Tipografiile Romane Unite, Bucharest.

[9] Plumb, I., Androniceanu, A. (2003). *Elemente moderne în Managementul Public, capitol in Abordări moderne în managementul şi economia organizaţiei* (*Modern Elements in Public Management, chapter in Modern Approaches in the Management and Economy of the Organization*), Ed: Nicolescu O., Plumb I., Pricop M., Vasilescu I., Verboncu I., vol. 3, Economica, Bucharest.

[10] Profiroiu, M. (2001). *Management of Public Organizations* (*Managementul organizaţiilor publice*), Economica, Bucharest.

[11] Profiroiu, M. (2002). Accelerating the Reformation of Publice Administration (Accelerarea Reformei Administraţiei Publice), *Transylvanian Review of Administrative Sciences*, VIII, 13-23.

[12] OCDE (2005). Moderniser l'État, la route à suivre, Paris.
[13] Rhodes, R.A.W. (1987). Developing the public service orientation, or let's add a soupcon of political theory, *Local Government Studies* (May-June), 63-73.
[14] Vigoda, E. (2002), From Responsiveness to Collaboration: Governance, Citizens, and the Next Generation of Public Administration, *Public Administration Review*, 62(5), 527-540.
[15] Romanian Government (2014). Decision No. 909 of October 15, 2014 on the approval of the Strategy for the Consolidation of the Public Administration 2014 -2020 and the establishment of the National Committee for the Coordination of Implementation of the Strategy for the Consolidation of the Public Administration 2014 -2020, the *Official Journal* No. 834 bis of November 17, 2014.
[16] Romanian Government (2001). Decision no. 951 of September 27, 2001 regarding the establishment of the Governmental Council for the monitoring of the public administration reform, the *Official Journal* No. 640 / 12.10.2001 (a).
[17] Romanian Government, Strategy regarding the computerization of the public administration, adopted by the Government by GD No. 1007/2001 (b).
[18] Romanian Government, Strategy of October 4, 2001 of the Government on accelerating reform in public administration, in *Official Journal* no. 660 of October 19, 2001 (c).
[19] Romanian Parliament, (2001). Law of local public administration No. 215/2001, the *Official Journal* No. 204/23 Apr. 2001).
[20] SIDA (2013). IrishAid, UKaid, Summary Report of Public Sector Governance Evaluation, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/199777/Public-sector-gov-reform-eval-summary.pdf.
[21] Transparency International EU (2016). *Strategy 2020: Empowered Citizens, an Accountable Europe*, avaiable at: https://transparency.eu/wp-content/uploads/2016/10/04-09-2016-Strategy-2020-web.pdf.

Sustainability Integration in Supply Chain Management through Systematic Literature Review

Narcisa Roxana MOSTEANU [1], Alessio FACCIA [2], Al ANSARI [3], Mohamed Dawood SHAMOUT [4], Fabian CAPITANIO [5]

[1] Corresponding author, Professor Dr. at American University of Malta, Malta; E-mail: narcisamosteanu@yahoo.com
[2] Assistant Professor Dr., Lecturer at Coventry University, Coventry, UK; E-mail: alessio.faccia@gmail.com
[3] Professor Dr. at Seattle University, Seattle, USA; E-mail: aansari@seattle.edu
[4] Assistant Professor Dr. at American University in the Emirates, UAE; E-mail: arch.mohd@hotmail.com
[5] Professor Dr. at Università degli studi di Napoli Federico II, Naples, Italy; E-mail: fabian.capitanio@gmail.com

Abstract

Drafting a systematic literature review on sustainable integration of supply chain and logistics is the main aim of this research paper, given the current needs expressed by academics, managers, and investors. Business sustainability, among all management tasks, heavily depends on successful integration between supply chain and logistics. Scholarly and academic double-blinded peer-reviewed journals, indexed in Scopus and EBSCO, are considered, in a time range between the years 2010 and 2019. Thus, summaries of journals are comprehensively assessed to appraise the integration between Sustainable Supply Chain Management and logistics in business markets. Through this work paper, the procedures behind an effective application of supply chain models are investigated in order to improve knowledge, in terms of recent advancements. The authors develop and carry out an effective business-case analysis, in which the application of Supply Chain Management and logistics procedures led to advancements in the field, therefore their systematic review will be beneficial in terms of a comprehensive current framework provision. According to the analyze explored by the authors, Decision Support Systems and computer frameworks really support business leaders in using Sustainable Supply Chain Management and logistics information and models, further providing specific training. The research paper observed that, indeed, a systematic review is an effective tool that encourages a thorough understanding of the key features related to the specific field. Despite limitations due to a small number of studies carried out on the specific topic, we strongly believe that this research will provide a great contribution to business management, towards an exhaustive, useful, and insightful analysis of the current studies on the integration between Sustainable Supply Chain Management and logistics applications.

Keywords: *sustainable supply chain management; systematic literature review; sustainability; corporate social responsibility.*

1. Introduction

Sustainability in supply chain and logistics had turned into a trendy feature. Nowadays, many drivers can be identified, such as remarkable maintenance quality, operating characteristics typical of a free market framework, and the focus on the so-called vitality, attributable to an extended awareness of the science on the environmental change (Gopal, Thakkar, 2016). These features are significant to managers, since all the stakeholders are progressively asking for a fair assessment of the natural and social impacts due to their performances and activities (Morali, Searcy, 2012; Gopal, Thakkar, 2016). Supply chain experts' perspective is the most advantaged in order to consider the impact of operational decisions on natural and social environment, for instance in terms of suppliers, transportation, vehicle, area, and bundling options. Furthermore, organization usually operates with the input provided by other players, in an interconnected chain that starts from natural resources and ends with the final consumer. The system regulation is called Store Network Administration – SNA (Cetinkaya, et al., 2011), whilst Production Network Administration – PNA involves capacity and development of crude materials, work in process stock, and merchandise production process from the outset to the consumption. Sustainability is one of the main attributes of the so-called Corporate Social Responsibility – CSR, which embraces natural and social perspectives in management's decisions, considering product and process innovations as a priority in terms of monetary business goals and environmental benefits. For instance pollution and clog due to products' transit, extreme exploitation of limited and precious natural Earth's resources such as land and water, conflicting interests between companies and workers in terms of low salaries and bad working condition in order to boost profits (Schaltegger, Burritt, 2014). Awareness of the importance of efficient and successful inventory network is arising, due to the need to mitigate the negative impact to earth and society (Moşteanu, 2020). It led managers, customers, investors, and international gatherings to prioritize the sustainability of store network (Morali, Searcy, 2012; Gopal, Thakkar, 2016). Different drivers are leading the development of better management tools, useful to ensure customers' mindfulness and companies' positive environmental and social conducts (Morali, Searcy, 2012; McPhee, 2014); country leaders are furthermore oriented to sustainable policies (Gopal, Thakkar, 2016). Hence an increasing number of studies on Sustainable Supply Chain Management (SSCM) and companies already include sustainable practices in their activities (Ashby, et al., 2012; Montabon, Pagell, 2016), covering every single key feature in the SSCM. Essentially, this article aims to provide a systematic review on sustainable supply chain and logistics management, by picking

the best scholarly research studies and supporting the methodology research to enhance the understanding of SSCM from a broader perspective. Furthermore, an overview of a systematic analysis of SSCM and logistics flow determination is provided.

2. Research methodology

The methodology is focused on a systematic literature review, which will mainly overlap the findings of this research paper. Scholarly and academic double-blinded peer-reviewed journals, indexed in Scopus and EBSCO, are considered, in a time range between the years 2010 and 2019, and included in the analysis. The systematic review focuses on three key terms: sustainability, supply chain and logistics, as ground-study. Therefore, since the review is the core of the analysis, purely relevant articles and journals that deal with sustainable supply chain and logistics were selected. This is to underly scholastic insights having a great connection with the aim of this study. Literature review is considered systematic since it addresses specific issues by recognizing, fundamentally assessing, and coordinating the discoveries of applicable, astounding examinations, tending to research questions. A comprehensive review may accomplish most, or the greater part, of the following (Creswell, 2014): (a) establish to what degree existing review in a systematic manner has advanced towards elucidating a specific issue; (b) identify study relations, logical consistencies of the systematic writing and investigate the purpose of journal review and analysis; (c) formulate scholarly reviews and its literature review articulations and overall concepts of sustainable integration of SCM and logistics; (d) assess, as well as generate, literature studies from the year 2010 to the year 2019 and understand its practices in the business society.

The number of journals/articles in not less than ten, and not more than thirty, they are mainly discussed in the literature review section of this paper. Nonetheless, a table (Appendix section) entails and supporting the content of the main text.

3. Literature review

3.1. Sustainable Supply Chain Management – SSCM

Sustainable supply chain and its connection to management standards is becoming a trending topic. Analysts pointed out that a need to overcome old limited perspectives only linked to monetary targets is becoming crucial for companies' sustainability. This purpose can be only achieved by operational efficiency and expenses reduction in a fair and respectful natural and social framework. Combining the Triple Bottom Line (TBL) principles with Supply Chain Management (SCM), it is possible to shape the SSCM framework (Govindan, Soleimani, Kannan, 2014). Maintainable Store Network Administration (SNA), Production Network Administration (PNA) along with production network demonstrate how sustainability should be achieved not only on the premise of financial goals but also through environmental and social responsibility (Beske, Seuring, 2014; Pagell, Schevchenko, 2014). The development of SNA along with sustainability demonstrated growing concerns on macroeconomic strategies and future evolutions. So far corporate management have proven reckless in the use of limited resources, the ozone hole is harming substance outflows so that buyers' mindfulness about work condition concerns is soaring.

Measurements of the TBL along with the production chain network (Govindan, Soleimani, Kannan, 2014) are allowing to develop feasible methodologies, although always necessarily focused on the short term on financial goals, also related to long haul connections and number of suppliers reduction in the long term perspective.

3.2. SSCM common meaning

Different definitions of Sustainable Supply Chain Management are disclosed. The vast majority of them were gotten from the sustainability improvement idea developed by the World Commission on Environment and Development as advancement that addresses the issues of the present without trading off the capacity of future ages to address their issues (Ahi, Searcy, 2013; Beske, 2012). Carter and Rogers (2008 in Singh, 2016) suggested a different meaning of SSCM as the key, straightforward combination and accomplishment of an association's social, ecological, and monetary objectives in the foundational coordination of key between authoritative business forms for enhancing long haul financial execution. The subsequent definition, from Carter and Rogers (2008 in Beske, Seuring, 2014), addresses social, natural, and financial objectives in business management. The TBL state that business ought to consider three measurements in their management including wealth, individuals, and the planet. Wealth is the conventional measure in business, while the earth and individuals can be considered as natural and social variables.

3.3. Challenges on management approach to sustainable chain

Challenges on management approach to the sustainable chain are mainly related to a lack of integration, namely separation, and independence, between social duties and sustainability. Many inventory network experts and scholars consider social responsibility as a duty. However, the awareness of interdependences among stakeholders, and the inclusion of factors such as earth, human rights, charity and security encompassed the Corporate Social Responsibility (CSR) and store network management maintainability concepts (Dey, LaGuardia, Srinivasan, 2011; Pagell, Schevchenko, 2014). Store network administrators used to examine companies as stand-alone entities, without a reasonable, comprehensive, and more vital comprehension of how those entities could be fitted together reach a better overall maintainability environment (Pagell, Schevchenko, 2014).

Managers, likewise, in the past, regularly failed in learning and taking the opportunity to benefit from knowledge and experience advancements in the environmental field, as different departments or different branches of the same company were not aware of those improvements (Ahi, Searcy, 2013). Nowadays, changes in corporate hierarchical frameworks allow expecting firms to be constantly updated on the knowledge related to environmental and social consequences. Those updates can be easily identified, not only considering the company as a stand-alone entity but in those connections that they set up in the production chain, in terms of coordinated effort and data sharing, as they started considering as partners all the members of the chain (Dey, LaGuardia, Srinivasan, 2011; Pagell, Schevchenko, 2014).

3.4. The relevance of SSCM

The commonly understood meaning of SCM focuses on company connections performed through contracts, information sharing, agreements, and all those networking activities that can be identified in a supply chain. Joining such those networks has turned into a key survival corporate strategy, since many benefits are provided for the company that is actively included in the chain (Brito, Berardi, 2010).

Despite the fact that inventory network structures and business forms are still the same, the reasons, why corporate managements are willing to join supply chains, have changed over time. Pagell and Schevchenko (2014) highlight that, apart from a presumed financial benefit, companies need to deal with CSR, since they have now additionally been considered responsible for positive social and environmental conducts, not

only at an individual level but also as part of the whole chain. Furthermore, public debates about sustainability are focusing on industries, rather than targeting and blaming specific companies (Pagell, Schevchenko, 2014). The addition of ecological and social targets to financial goals has prompted a wide range of ideas, linked to sustainability concerns in the store network analyses (Abbasi, Nilsson, 2012).

Company managers usually start considering environmental and social matters, to be included in companies' visions, and only after some time they can begin to select the right partners in the chain to cope with specific, more virtuous goals and requirements, either through systems or conventional SSCM. Public debates on the need for sustainable processes integration along with production network started to arise after the year 2014, reasonably suggesting to perform productions considering environmental and requirements, in addition to financial targets, thus joining so-called Green Supply Chain Management frameworks (Abbasi, Nilsson, 2012).

Sometimes sustainability and flexibility are confusing considered as synonyms. In practice, two main differences can be identified: 1) A proactive approach related to forecast and negative consequences avoidance in the future to fuel the growth; 2) An adaptive approach that tries to limit damages that have already determined a negative impact (Ahi, Searcy, 2013; Carter, Easton, 2011). As research on sustainability progressed, worldwide productions gradually started applying TBL principles in supply chains (Ashby, Leat, Hudson-Smith, 2012; Abbasi, Nilsson, 2012).

4. Sustainable Logistics

The interest on sustainable logistics in the supply chain has been developing for over 10 years, it now considered an accepted standard. The increasing appeal of green supply chain management is therefore confirmed (Cosimato, Troisi, 2015). However, it must be said, any activity aimed to reduce the ecological footprint initially generates an additional financial burden. Hence, huge natural enhancements strategies were considered responsive rather than proactive, but this perspective is currently likewise changing. Environmental security and sustainability have turned into a fundamental concern in business activities, driving numerous Chief Operating Officers to focus on upgrades in sustainable operations as one of their best goals (Cosimato, Troisi, 2015). Any organization that is suitable or willing to apply a Supply Chain Management system, usually can and do execute SSCM systems as well. The advancement provided by SSCM is linked to the further comprehension of the general connections between supply chains and the environment. Thus, considering the integration of sustainability, it is critical to investigate it in terms of outsourcing practices. As outsourcing is standardized and it usually benefits from economies of scale, it has progressively been provided by professional suppliers, changing the ways how purchasers and providers behave (Cosimato, Troisi, 2015). A new stage, the environmental one, has started to be added in coordination settlement processes. Since 2016, it has been noticed how this stage has become central for the development and control in logistics. Regardless of the financial expectations, which are always implicitly considered for the survival of a company, many analysts and scholars started heavily discussing social and environmental concerns in logistics as well as their measurements in CSR (Ahi, Searcy, 2013). Business supervisors have frequently considered social obligations as a duty, rather than an opportunity, which affects financial performances, through additional expenses. Scholars, managers, and supervisors now agree that conceivable reasons support the inclusion of social and environmental duties in logistics perceptions, since the absence of any awareness in that sense, affects the sustainability of the whole system and the trust of the environment in the system itself.

Carter and Rogers (Ahi, Searcy, 2013) suggested a reasonable hypothesis framework to introduce a system of sustainability linked to the inventory network similar to the SSCM (Ahi, Searcy, 2013). Managers and supervisors are now encouraged to take part on social and environmental international gatherings in order to understand how to include those two features in their targets, without affecting, rather improving financial performances. Carter and Rogers (Ahi, Searcy, 2013) are persuaded that the application of SSCM, is not optional, but instead a need. SSCM includes the long-run changes and improvements of companies' financial concerns, and it pushes supervisors to enable supply chain management systems to take active actions (Abbasi, Nilsson, 2012). Having therefore identified the triple (financial, environmental, and social) objective as necessary, a recycling policy can be considered essential, as it allows to reduce costs, with immediate three-way benefits. The reduction in turnover also makes it possible to increase workers' well-being and enhance working conditions, increasing efficiency thanks to improved workers' commitment. The execution of ISO-based benchmarks and outline for dismantling and reuse allow cost reductions, shorter lead-times, enhanced item quality, and lower transfer costs. Better identification of hierarchical roles can also make a firm more alluring to the clients and providers (Wiese, et al., 2015).

5. The Integration of Supply Chain and Logistics Sustainability

5.1. Modern business hubs

The integration of SSCM and logistics in the modern business hubs is persistently developing rivalry due to territorial limits and rough competition (Forslund, 2014). Sustainability concerns are growing in significance due to better partners' awareness of worldwide supply chains. Despite their vital role in pretending sustainable conducts in their supply chains, retailers will not probably have a huge impact, unless they are supported by their supply chain partners in producing sustainable products, through sustainable distribution channels (Wiese, et al., 2015). Due to their size (in terms of volume of products), which award them with strong commercial power, retailers are considered potentially capable to change rehearses along with the production network (Wiese, et al., 2015). As transport is considered the biggest environmental challenge in the logistics framework, its coordination assumes a critical role in sustainable improvements (Abbasi and Nilsson, 2012). Hence, a focus on the analysis of retailers' sustainability inside logistics is appropriate. Despite the significance of joining environmental sustainability into logistics, investigations, and analysis performed so far are still inadequate (Wiese et al., 2012). Earth's needs are not negligible and, unfortunately, they are still not considered as a priority. The sustainability aim raises new managerial challenges, such as the troublesome production in SSCM engagement, for retailers (Elg, Hultman, 2016). Sharing open CSR reports among partners can be considered a key strategy (Elg, Hultman, 2016), since it helps to increase awareness.

5.2. The environment in SCM and logistics operations

Many logistics practices can include environmentally friendly features. Pazirandeh and Jafari (2013) usually apply model frameworks to analyze the impact of logistics practices, such as the crude material procurement in outbound logistics. In a trending paper which analyzed the natural production network management activities in retailing organizations, Bjorklund and Forslund (2018) distinguished eight wide natural production network classifications that include, both logistics retailers' practices and pointers since frequently examined in sustainability reports. The purchase of the cycle of a company assumes a key

role in this process since it involves the choice of suppliers, which consequently influences distribution and transport channels, and materials included in the products (Pazirandeh, Jafari, 2013). Transport is the biggest source of environmental impact in the logistics framework, raising concerns and awareness in the choice of more efficient transportation ways and enhancing utilization of multi-purpose transport arrangements (Bjorklund, Forslund, 2018).

5.3. Logistics agenda schedule

Logistics agenda schedule can improve transport strategies, regularly enhancing dispersion-free systems and constantly increasing the efficiency of trade routes (Bjorklund, Forslund, 2018). Transport management may include outsourced logistics suppliers, which can lead to benefits in terms of efficiency. Mode choice, multi-purpose transport, specialized arrangements, transport provider choice, eco-proficient driving, are determinants for logistics framework outline and transport management. Despite warehousing is frequently neglected in the consideration of feasible logistics, it has a critical impact (Carter, Easton, 2011), for example through vitality management of stockroom assets, like hardware, warming, lighting and ventilation (Forslund, 2014). Area and limit of stockrooms were found to affect the potential outcomes for the reduction of environmental impact (Carter, Easton, 2011). Reverse logistics, where retailers have ended up obliged by law to reclaim and reuse their own materials, as well as the determination of load transporters or the transfer management are complex yet fundamental parts of sustainability (Wiese, et al., 2012; Wiese, et al., 2015).

5.4. SCM based company's awareness

SCM based companies' awareness points towards consistency with existing law frameworks and controls related to sustainability, however only sometimes study carried so far managed to be consistent (Closs, et al., 2011). They may likewise embrace activities related to current challenges, since non-financial measurements of sustainability are not considered as a priority and excluded from the basic leadership process (Closs, et al., 2011). Few organizations endeavor to impact the market by persuading clients highlighting green improvements in their products as a reasonable value added (Brindley, Oxborrow, 2014). Organizations with a proactive awareness have commonly perceived the vital significance of environmental features (Qaiser, et al., 2017), those companies are able to identify environmental and social issues before these are commonly recognized, and proactively include good practices in the life cycle of their items. Sustainability benchmarking is useful to recognize potentially profitable and fair activities in specific industries or cross-industry (Closs, et al., 2011). Moreover, proactive managements endeavor to help setting new laws by deliberately beginning fair projects (Bjorklund, Forslund, 2018) they also associations aimed to handle this challenge. With regards to network contributions, some companies may be interested, but still averse to start such practices (Qaiser, et. al., 2017). Other forward-looking managements pretend to include sustainability practices into the business methodology, and their commitment is considered as a vital need (Bjorklund, Forslund, 2018). Consequently, the present research intends to provide an insightful and complete survey on reasonable green production network management behaviors and practices, by considering and investigating significant methodology in sustainable logistics and SSCM combined.

6. Findings and Conclusions

This systematic review on sustainable integration of SCM and logistics ideally addressed significant challenges that revealed the need for SSCM logistics among companies in this modern world. This literature review mostly also considered plans at management behaviours since they can generate many spill overs (Creswell, 2014). The selected studies included in the research specifically addressed the research question, as well as efficiently introducing the best practices and discoveries in the field (Baumeister, 2013). This tested and reliable approach aims to increase objectivity and avoid authors presumptions, through an overall analysis of systems, evidence and conclusions, rather than only rely on researchers' decisions (Creswell, 2014). This research strategy additionally enables different scientists to refresh an updated survey so as to include new discoveries (Baumeister, 2013). Measurable techniques might possibly be utilized to break down and abridge the after-effects of the included investigations (Baumeister, 2013). This review also provides an interdisciplinary diagram of the transversal abilities distinguished in supply chain and logistics, to compare different features. A careful survey was led to recognize the transversal skills portrayed throughout the years in philosophical, sociological and instructive fields (Cumming, 2014). Then, shows the connection between these abilities and the standards and properties proposed in the application of sustainable supply chain and logistics. Creswell (2014) reiterated how these capabilities can be considered as crucial drivers for an effective life and prosperity of people inside an economic system. Nowadays learners and instructors are facing many difficulties in their everyday lives. It has now been generally recognized that taking control of one's need requires a high level of awareness of the supporting networking capabilities and a complete relevant studies framework to be able to understand and provide a remarkable contribution. The assumption that sustainability is a comprehensive tool helps to consider the importance of research evidence and standards (Baumeister, 2013). Therefore, this systematic review provides a powerful framework which ensures insights consistent with contents and it proves the validity of reliable studies considered. Management students should be motivated and encouraged to deliver systematic reviews through the observation of current practices of a sustainable supply chain and logistics management respectively.

References

[1] Abbasi, M., Nilsson, F. (2012). Themes and challenges in making supply chains environmentally sustainable, *Supply Chain Management: An International Journal*, Vol. 17 Issue: 5, 517-530.

[2] Ahi, P., Searcy, C. (2013). A comparative literature analysis of definitions for green and sustainable supply chain management, *Journal of Cleaner Production*, 52:329-341.

[3] Ashby, A., Wilding, R., Leat, M., and Hudson-Smith, M. (2012). Making Connections: A Review of Supply Chain Management and Sustainability Literature, *Supply Chain Management: An International Journal* (17:5), pp. 497-516.

[4] Baumeister, R. (2013). Writing a literature review. In Prinstein M.J., Patterson M.D. (Eds.), *The portable mentor: Expert guide to a successful career in psychology*, 118-134; 2nd ed.). New York: Springer Science-Business Media.

[5] Beske, P. (2012). Dynamic capabilities and sustainable supply chain management. *International Journal of Physical Distribution & Logistics Management*, 42 (4), 372-387.

[6] Beske, P., Seuring, S. (2014). Putting sustainability into supply chain management, *Supply Chain Management: An international journal*, 19 (3), 322-331.

[7] Bjorklund, M., Forslund, H. (2013). The inclusion of environmental performance in transport contracts, *Management of Environmental Quality: An International Journal*, Vol. 24 Issue: 2, 214-227.

[8] Bjorklund, M., Forslund, H. (2018). Exploring the sustainable logistics innovation process, *Industrial Management & Data Systems*, Vol. 118 Issue: 1 204-217.

[9] Brito, R., Berardi, P.C. (2010). Vantagem Competitiva na Gestão Sustentável da Cadeia de Suprimentos: um metaestudo. *Revista de Administracao Eletrônica – RAE*, 50 (2), 155-169

[10] Cetinkaya, B., Cuthbertson, R., Ewer, G., Klaas-Wissing, T., Piotrowicz, W., & Tyssen, C. (2011). *Sustainable Supply Chain*

Management: Practical Ideas for Moving Towards Best Practice. Berlin: Springer-Verlag.
[11] Closs, D. J., Speier, C., Meacham, N. (2011). Sustainability to support end-to-end value chains: the role of supply chain management, *Journal of the Academy of Marketing Science*, 39 (1), 101-116.
[12] Cosimato, S., & Troisi, O. (2015). Green supply chain management: Practices and tools for logistics competitiveness and sustainability. The DHL case study, *The TQM Journal*, Vol. 27 Issue: 2, 256-276.
[13] Creswell, J. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th ed.). Thousand Oaks, CA: Sage.
[14] Cumming, G. (2014). The new statistics: Why and how. *Psychological Science*, 25, 7-29. Comprehensive, scholarly and very clear, detailed discussion of problems with null-hypothesis statistics testing (p-values), and arguments for using estimation instead (i.e. effect sizes, confidence intervals, meta-analysis).
[15] Dey, A., LaGuardia, P., Srinivasan, M. (2011). Building sustainability in logistics operations: a research agenda, *Management Research Review*, Vol. 34 Issue: 11, pp.1237-1259.
[16] Elg, U., Hultman, J. (2016). CSR: retailer activities vs consumer buying decisions, *International Journal of Retail & Distribution Management*, Vol. 44 Issue: 6, pp.640-657.
[17] Gopal, P., Thakkar, J. (2016). Analyzing Critical Success Factors to Implement Sustainable Supply Chain Practices in *Indian Automobile Industry: A Case Study, Production Planning & Control* (27:12), 1005-1018.
[18] Govindan, K., Soleimani, H., Kannan, D. (2015). Reverse Logistics and Closed-Loop Supply Chain: A Comprehensive Review to Explore the Future, *European Journal of Operational Research* (240:3), pp. 603-626.
[19] Forslund, H. (2014). Exploring logistics performance management in supplier/retailer dyads, *International Journal of Retail & Distribution Management*, Vol. 42 Issue: 3, pp.205-218.
[20] McPhee, W. (2014). A New Sustainability Model: Engaging the Entire Firm, *Journal of Business Strategy* (35:2), 4-12.
[21] Montabon, F., Pagell, M. (2016). Making Sustainability Sustainable, *Journal of Supply Chain Management*: April, 11-28.
[22] Morali, O., Searcy, C. (2012). A Review of Sustainable Supply Chain Management Practices in Canada, *Journal of Business Ethics*, (117:3), 635-658.
[23] Moşteanu, N.R., (2020). Education, qualification awareness and social civism to build and sustain a healthy and developed society. Conference Proceedings of *28th European Biomass Conference, EUBCE 2020*, Marseille, France, 27-30 April, 2020.
[24] Oxborrow, L., Brindley C. (2014). Disintermediation in the apparel supply chain, *Journal of Fashion Marketing and Management*, Vol. 18 Issue: 3, 252-268.
[25] Pagell, M., Shevchenko, A. (2014). Why research in Sustainable Supply Chain Management should have no future, *Journal of Supply Chain Management*, 50 (1), 44-55.
[26] Pazirandeh, A., Jafari, H. (2013). Making sense of green logistics, *International Journal of Productivity and Performance Management*, Vol. 62 Issue: 8, 889-904.
[27] Qaiser, R., Ahmed, K., Sykora, M., Choudhary, A., Simpson, M. (2017). Decision support systems for sustainable logistics: a review and bibliometric analysis, *Industrial Management & Data Systems*, 117 (7). pp. 1376-1388.
[28] Schaltegger, S., Burritt, R. (2014). Measuring and managing sustainability performance of supply chains: Review and sustainability supply chain management framework, *Supply Chain Management: An International Journal*, Vol. 19 Issue: 3, pp.232-241.
[29] Singh, A. (2016). Sustainable green supply chain management: Trends and current practices, *Competitiveness Review: An International Business Journal*, Vol. 26 Issue 3.
[30] Weise, A., Kellner, J., Lietke, B., Toporowski, W., Zeilke, S. (2012). Sustainability in retailing – a summative content analysis, *International Journal of Retail & Distribution Management*, Vol. 40 Issue: 4, 318-335.
[31] Wiese, B., Knecht, M. (2015). Socialization into organizations and balancing work and family. In *Vuori*, J., Blonk, R., Price, R. (Eds.), *Sustainable working lives. Managing work transitions and health throughout the life course* (pp. 87-105). New York, NY: Springer. doi:10.1007/978-94-017-9798-6_6

Appendix

The following table is a summary of the recent journal studies and their respective authors and date of publications that highlight and stresses out main terms such as the supply chain and its logistics management alongside its sustainable integration.

Author/s	Date of Publication	Journal Summary
Craig R. Carter P. Liane Easton	2011	The motivation behind this paper is to direct an efficient survey of the SSCM writing in the foremost logistics and supply chain administration diaries, over a 20-year time period. The creators utilize an orderly writing survey procedure. This approach takes into consideration the minimization of specialist inclination and the expansion of unwavering quality and reliability. The investigation's observational legitimacy is additionally upgraded by showing large amounts of between coder dependability crosswise over groups of codes. The field of SSCM has developed from a point of view and examination of independent research in social and ecological regions; through a corporate social obligation viewpoint; to the beginnings of the meeting of viewpoints of manageability as the triple primary concern and the rise of SSCM as a hypothetical system. While the SSCM look into has turned out to be all the more hypothetically rich and methodologically thorough, there are various open doors for additionally propelling hypothesis, technique, and the administrative significance of future request. The patterns and holes distinguished through our examination enable us to build up a pertinent plan to direct future SSCM inquire about. The present points of view of SSCM hold critical ramifications for directors, by coordinating constrained assets toward ventures which meet natural and additionally social execution, and monetary execution. The paper gives an orderly, thorough, and methodologically substantial audit of the advancement of exact SSCM inquire about crosswise over 20-year time span.
Asoke Dey Paul LaGuardia Mahesh Srinivasan	2011	The reason for this examination is to inspect the present condition of maintainability endeavours inside the field of inventory network administration, all the more particularly SCM logistics tasks, and to recognize openings and give suggestions to firms to take after practical activities. This examination additionally means to empower additionally investigate inside the territory of supportable logistics activities. The reason why it is essential to actualize maintainability into store network tasks is talked about. In light of a survey of the surviving writing, different territories inside the logistics work where supportability can be actualized are then displayed. Some here and now and long-haul proposals for the effective execution of supportability in the logistics capacity of supply chains is given. There has been next to no work done to comprehend the part and significance of logistics in an association's mission towards supportability. For firms to actualize a manageability system in their inventory network tasks, logistics work needs to assume an unmistakable part in view of the extent of costs included and the chance to recognize and dispense with wasteful aspects and lessen the carbon impression.

Author/s	Date of Publication	Journal Summary
Asoke Dey Paul LaGuardia Mahesh Srinivasan	2011	Firms in their mission for economic activities must begin early and begin basic. A best administration responsibility is required for such endeavours to be fruitful. Additionally, firms should have the capacity to envision and guide out their supply chains and benchmark their supportability endeavours with different firms in their industry. Firms need to take after manageable practices in their general activities and in their logistics tasks specifically in light of the fact that not exclusively does it have money related and other elusive advantages, yet it is likewise the best activity. Firms have an awesome social obligation particularly as for utilization of non-inexhaustible wellsprings of vitality and materials and furthermore regarding how their items are utilized and taken care of once they achieve the finish of their life cycles. This paper is the first of its kind which inspects the condition of supportability inside the field of SCM tasks and recognizes regions and sets the plan for future research in this field.
Maisam Abbasi Fredrik Nilsson	2012	The motivation behind this article is to investigate topics and difficulties in making supply chains earth manageable. The examination started with an orderly audit, and substance investigation of articles in top-ranking related diaries from logistics, transport, manageability and natural territories, and finished with inquire about suggestions adding to the further headway of store network administration. The discoveries delineate the real subjects distributed in 18 diaries focusing on manageable supply chains with extraordinary spotlight on natural issues. From the methodical survey five noteworthy territories of difficulties for inventory network administration are inferred: costs, many-sided quality, outlook and social changes, and vulnerabilities. From these territories integrating discourses are given and research recommendations proposed. It is inferred that there is an incredible requirement for models and systems that consider the unpredictability included, take all encompassing points of view, and test the fundamental presumptions hidden a large portion of the examination distributed (i.e. reductionism, positivism and financial development). Supportability in this article is for the most part identified with ecological issues. Examination of complex connections between natural, social and monetary perspectives may give chances to future research. The outcomes introduced in this paper give a deliberate structure to ordering issues identified with SCM and logistics manageability; something which will be useful for directors and policymakers when they approach feasible inventory network administration challenges. This paper gives recommendations to look into in view of the new result of difficulties that can direct research, industry and policymakers in future SSCM and logistics management endeavours.
Ali Pazirandeh Hamid Jafari	2013	The reason for this paper is to basically assess regardless of whether greening endeavors are reliant on a more elevated amount far reaching supportability procedure to be done and regardless of whether greening endeavors prompt any adjustments in logistics adequacy and logistics productivity. The paper depends on observational information gathered by means of a review sent to logistics supervisors and transport buyers at Nordic multinationals. The outcomes were breaking down utilizing basic condition show as to approve the foreseen connections between the planned builds. Inside this exploration, the creators have attempted to approve the presence of connections between an organization's supportability system, its transportation greening endeavors and logistics execution. The paper explores the conceivable impact the supportability methodology of the firm will have on its choice to green its transportation, and the conceivable impact these measures will have on logistics proficiency and viability. The observational information accumulated for this examination is locally confined to the Nordic district. Additionally, research could observationally test these associations with exact information from different nations or enterprises, maybe utilizing other execution builds, to check whether the outcomes remain constant. It is demonstrated that organizations with a maintainability procedure are concentrating on greening their transportation both from buying and activities viewpoints to enhance their whole ecological execution. The outcomes from this paper neglect to help the presumption that all-inclusive supportability methodologies are basic for inventory network greening. The paper is among the primary endeavors in investigating the connections between an organization's manageable methodology and its logistics execution through greening the transportation exercises.
Kannan Govindan Hamed Soleimani Devika Kannan	2014	In view of natural, lawful, social, and financial variables, switch logistics and shut circle production network issues have pulled in consideration among both scholarly world and experts. This consideration is clear by the tremendous number of distributions in logical diaries which have been distributed as of late. Subsequently, an exhaustive writing survey of later and best in class papers is essential to draw a structure of the past, and to reveal insight into future bearings. The point of this paper is to survey as of late distributed papers backward calculated and shut circle inventory network in logical diaries. A sum of 382 papers distributed between January 2007 and March 2013 are chosen and explored. The papers are then broke down and sorted to build a helpful establishment of past research. At long last, holes in the writing are recognized to illuminate and to propose future research openings.
Stefan Schaltegger Roger Burritt	2014	The motivation behind this paper is to talk about what a completely practical store network may look like and the results that can be drawn from this view. Likewise, it builds up a down to earth approach towards manageability production network execution estimation and administration. The paper builds up a systematic structure for the appraisal of methodologies for the estimation and administration of supportability execution of supply chains (SPSCs). Little research has been directed on the issues, existing strategies and conceivable ways to deal with measure and oversee SPSCs. Writing audit and calculated advancement of system. The paper builds up a scientific structure for the appraisal of methodologies for the estimation and administration of SPSCs. Existing methodologies talked about in the vein of enhancing supply chains and expanding reusing are analyzed in the light of our structure, and territories to broaden the examination on manageability execution estimation and administration are recognized. Open doors for expansion of research on manageability execution estimation and administration of supply chains are recognized. The system offers assistance to directors in their decision of manageability execution estimation and administration approaches. The paper gives an organized outline of supportability execution estimation and administration writing and ways to deal with store network administration. The system proposed gives an establishment to additionally inquire about.
Silvia Cosimato Orlando Troisi	2015	Globalized SCM and logistics has driven overall associations to adjust their monetary and ecological exhibitions with a specific end goal to accomplish a solid manageable improvement. In an ecological focused world, logistics is called to put enthusiastically propelled programs in light of mechanical and hierarchical change, keeping in mind the end goal to pick up or keep up a solid upper hand. The motivation behind this paper is to explore how logistics associations endeavor to confront the ongoing environmental difficulties and the part that the eminent green advancements play in making them at long last "green" and focused. Green production

Author/s	Date of Publication	Journal Summary
Silvia Cosimato Orlando Troisi	2015	network administration (GSCM) rehearses have been explored to all the more likely comprehend their effect on monetary execution and corporate intensity. Subsequent to giving a foundation exchange on Green Logistics and GSCM, the creators have likewise recognized particular research addresses that are deserving of examination, additionally exhaustive the DHL contextual analysis. The contextual investigation examination has been directed by a particular calculated model (Rao and Holt, 2005), which permits a more profound comprehension of writing survey comes about. The present paper offers a few bits of knowledge on development impact on store network administration (SCM) greenness, a procedure arranged to a practical and ecological inviting way to deal with administration of inventory network. As indicated by DHL contextual analysis prove, in logistics advancement, frequently in view of rising green innovations, is entirely identified with the improvement of a significantly more practical and condition well-disposed way to deal with SCM, in light of lessening of center exercises' natural effect, cost sparing, quality, unwavering quality, execution and vitality proficiency. In this unique circumstance, the regard of natural controls is major to accomplish a diminishment of environmental harm, as well as to generally speaking financial benefit. There is a solid need of further research to all the more likely comprehend the potential connection between GSCM, green development and calculated associations aggressiveness. Indeed, this exploration zone still speaks to a wellspring of intriguing difficulties for specialists, academicians and scientists. Finishing up, the examination discoveries can't be summed up to every single strategic association, regardless of whether DHL is on of the most critical and globalized calculated organizations. Future examines ought to observationally test the accomplished outcomes additionally through relative examinations in light of a huge example. The proposal of writing audit and the after-effect of contextual investigation examination speak to a first endeavor to all the more likely comprehend the genuine and potential impact of GSCM on corporate picture and intensity. Actually, the present examination has called attention to that calculated association can accomplish ecological objectives and secure a superior situating than their rivals likewise participating with partners. In this way, it is important that associations add to make them ready to take an interest in corporate exercises and build up a solid ecological amicable introduction, in view of the regard of market's solicitations and natural controls keeping in mind the end goal to get their corporate notoriety solid than at any other time.
Amol Singh	2016	The motivation behind this paper is to surrender a to-date and organized knowledge into the writing distributed amid the most recent multi decade on feasible SSCM. It likewise proposes patterns for future research in light of the exploration issues distinguished through precise and far reaching investigation of past examinations in the zone of gree2n and economical inventory network administration. A best in class writing survey is done by deliberately gathering the current writing over a time of 10 years and classifying it based on characteristics, for example, arranges in production network, philosophy and the ventures/areas under thought. The characterization of writing is additionally done by the geographic area and year of production. There has been an expanded enthusiasm among analysts and experts in the territory of practical green store network administration in the previous decade. A requirement for accomplishing maintainability through appropriation of greener practices has been all around felt, inferable from an expanding natural and environmental many-sided quality. The audit uncovers that there exists a need to address conduct issues like human asset administration, inventory network accomplice relationship administration, and so on. A large portion of the past audits have either centre around particular issues identified with maintainable supply chains just or green supply chains. The present examination by and large mulls over articles both from green inventory network administration and also from feasible production network writing that have a prime spotlight on ecological manageability.
Fahham Hasan Qaiser Karim Ahmed Martin Sykora Alok Choudhary Mike Simpson	2017	There exist numerous meanings of DSS in the writing. Actually, DSS is exceedingly setting touchy as it implies distinctive things to various individuals. The DSS as intelligent PC based frameworks, which help leaders use information and models to take care of unstructured issues. As the picked branch of knowledge is similarly new, the extent of the examination is additionally extended from the given DSS definition and furthermore incorporates DSS systems and models and in addition survey articles that may contribute towards building up a DSS. This additionally includes papers tending to SSCM logistics issues close by their emphasis on production network. This paper is an endeavor to lead a precise writing audit of DSS for sustainable logistics which uncovers the current condition of research around there and furnishes specialists and associations with a course to build up this field further. The rest of this paper is sorted out as takes after; the strategy is examined in the following segment taken after by starting information investigation and measurement examination, talk area lastly the conclusion.
Maria Bjorklund Helena Forslund	2018	The improvement of more maintainable logistics calls for imaginative reasoning. With a specific end goal to quicken the improvement in the field, there is a requirement for expanded comprehension of the procedure behind effective usage of practical supply chain advancements (SLI). The reason for this paper is to investigate the SLI procedure, keeping in mind the end goal to distinguish basic elements, challenges and also performers included. A different contextual analysis in six Swedish retailers and LSPs, fruitful in SLI executions, was directed. Both inside case and cross-case examinations were connected. The SLI procedure comprises of five stages. The positive connection amongst formalization and SLI achievement is upheld. Basic exercises and difficulties not known from writing were found in each stage. Illustrations are the utilization of SCM logistics and client KPIs, briskness, creating basic ideas, utilizing a supportability business case layout and choosing where to test SLIs. A few stages are including numerous interior and outer on-screen characters, while others include couple of inside performing artists. Clients are not especially included, and retailers include their LSP providers. This examination tends to the absence of experimental research in SCM advancement and has crossed over any barrier of development ponders in different organizations than in LSPs. Besides it has consolidated two creating zones, economic advancement and logistics development, into SLI. Various basic exercises and difficulties, and complex examples for performing artists' association in the SLI procedure stages are investigated as bits of knowledge from specific cases; these outcomes could be diagnostically summed up to hypothesis. The useful ramifications lie in directing chiefs who wish to enhance supportability and inventiveness in business achievement. Learning from effective organizations about which stages to experience in which grouping, which challenges that can be required and who to incorporate into the SLI procedure could infer that more organizations centre on SLI. Information on the most proficient method to incorporate maintainability in a reasonable advancement process e.g. by making solid business cases ought to suggest a quickened improvement of supportable logistics in the public arena. This investigation tends to the absence of observationally based research in SSCM advancement and extends the idea to retailers.

The Driving Factors of Behavior Management of E-Waste Using an Approach to the Theory of Planned Behavior

FX. Joko PRIYONO[1*], Nuswantoro DWIWARNO[1], Naili FARIDA[1]

[1]Diponegoro University, Jl.Prof. H. Soedarto, S.H., Tembalang, Semarang, Jawa Tengah 50275, Indonesia
[*]Corresponding author; E-mail: fransiskusjoko893@gmail.com

Abstract

An understanding of the factors driving behavior management of e-waste is very important to understand. The purpose of this research is to test an attribute theory planned behavior in the context of concern on e-waste. The respondents in this study are 200 respondents from Central Java Indonesia. The analysis used is the structural equation modeling-Partial Least Square (SEM-PLS). To process data is by using WarpPls software version 6. The results of this research show that the attitudes, behavior and perceived knowledge is very influential on improving a person's interest in managing e-Waste. Other results make it clear that a person who has an interest to manage e-waste then it will affect directly on the behavior. Managerial implications in this research were the establishment of community e-waste Manager. The goal is to accelerate society's behavior in managing e-waste.

Keywords: *e-waste; management; SEM-PLS; behavior; community.*

1. Introduction

E-waste is one of the research topics that are important to researched. Electronics waste or e-waste is often said is that electrical and electronic equipment is disposed of as waste without intent for reuse (Step, 2014). Some of the literature makes it clear that many countries are starting to care for and manage e-waste, among others China, India (Awasthi & Li, 2017), Australia (Golev et al., 2016), India (Saoji, 2012), Europe Union (Awasthi et al., 2018). E-waste has become a worldwide attention (Awasthi & Li, 2017) because it has become a threat and challenge to the sustainability of the Earth. The main problems related to electronic waste management is an improper disposal, causing significant environmental impact (Herat & Agamuthu, 2012).

The growth of e-waste is the negative impact of the development of industrial technology, information, and communications (Saoji, 2012). Electronic goods are developed, applied, sold and used at a very high level all around the world (Imran et al., 2017). E-waste is the waste electrical and electronic equipment is a whole that cannot be processed. The waste residue could either be in the form of tools, equipment, or parts of the already broken and unused again. Some examples of electronic waste are such as computers, LCD, cell phone, refrigerator, television and others. This shit is dangerous because it contains toxic materials that are able to harm human health. E-waste also contains a number of toxic substances that can't be ignored (e.g., cadmium and lead) and thus considered harmful if administered improperly (Bakhiyi et al., 2018).

This research uses the Theory of Planned Behavior (TPB) as a basis. Some research related to e-waste and recycling using basic TPB (Philippsen, 2015). The purpose of this research was to test an attribute theory planned behavior in the context of concern on e-waste. In the current study developed some research questions, namely:

Q1: Does knowledge effect on interest in managing e-waste?

Q2: What is the attitude of the effect on interest in managing e-waste?

Q3: Does the subjective norm effect on interest in managing e-waste?

Q4: What does the perceived behavior control will be effect on interest in managing e-waste?

Q5: Does the interest effect on behavior of managing e-waste?

2. Theoretical Frameworks and Hypotheses

2.1. Behavioral and Socio-cultural aspects in E-waste management

In our globalized economy, increasing volumes of used electronics are shipped across national borders. While global and regional regulations prioritize electronics reuse as a prudent approach for conserving resources and reducing environmental toxicity, their effect on cross-border shipping activities of the reuse industry is not well-known. Due to rapid economic growth, faster upgrade of electrical and electronic equipment causes the ever-increasing quantity of waste electrical and electronic products (WEEE). E-waste is one of the fastest growing waste streams in the world in terms of volume and its environmental impact on the planet. The existence of precious metals in the e-waste stream provides a major economic benefit for recycling industries but due to the presence of hazardous chemicals, a proper recycling technique is required prior to the disposal of the e-waste. Through reviewing the present status of e-waste industry and the legal system in China, Wei and Liu's (2012) article analyzing several problems and barriers in China's e-waste recycling industry: (a) illegal e-waste import from developed countries; (b) the booming development of China's informal recycling sectors; (c) informal disposal leading to serious environmental problems and human health impacts; (d) formal companies facing with the problems of severe lack of e-waste; (e) the morbidity of China's regulatory and legal system.

This is based on the fact that at present, China is not only a large consumption nation of electrical products, but also a largest importer of e-waste. What's more, compared with several developed countries in e-waste management, Wei and Liu (2012) recommend that (a) building up the regulatory system of e-waste management in both central and local government; (b) encouraging the development of formal disposal of WEEE; (c) forcing enterprises to focus on Extended Producer Responsibility (EPR). Moreover, e-wastes in China are growing dramatically. Since 2009, the Chinese government has continuously issued a series of laws and regulations and established a preliminary e-waste management system based on extended producer responsibility (EPR) principles, so as to protect the environment and improve resource utilization. In a similar sense, Cao et al. (2016) conducted analysis to examine the effectiveness of current e-waste management in China in detail from the government policy, enterprise and public awareness perspective. Government regulations and amendments of relevant policies, which are consistent with the status to promote the emergence and development of formal e-waste recycling enterprise, are introduced and examined. Chinese current e-waste recycling technology, capacity and equipment are discussed as well as the construction and operation of several leading enterprises and a national industrial park. Chinese people's awareness of e-waste hazards, disposal habits and participation in environmental initiatives are also surveyed to guide the future measures. Promoted by the efforts of the government, enterprises and citizens, Chinese e-waste management has been improving for the past six years and it continues to develop. Finally, potential remaining problems of e-waste management are examined and their possible solutions are proposed.

Favot and Grassetti (2017) examine the performance of household electrical and electronic waste (WEEE) collection in 20 Italian regions from 2008 to 2015. The impact of several explicative variables on the results of e-waste collection is evaluated. The independent variables are socio-economic and demographic ones (age, gender, household size, education level, migration and income) along with technical-organizational variables (population density, presence of metropoles, macro regions, characteristics of the territory, percentage of household waste collected separately and number of e-waste collection points). The results show that the presence of collection points, the percentage of household waste collected separately and the percentage of females are positively correlated with the kg collected per inhabitant per year. For example, a variation of 1% of input (presence of collection points) corresponds to a 0.25% variation in the output (collection results) while 1% difference in the percentage of females in the population corresponds to a 7.549% difference in the collection rate. Population density, instead, is negatively correlated. It is interesting to note that there is a discrepancy between the Southern regions and the Centre regions (the former has an outcome 0.66 times lower than the latter) while the Northern regions perform similarly to the Centre ones., the first year (2008) had a very low performance compared to the following years when the scheme constantly improved, mainly due to the additional collection points available. The Stochastic Frontier Model allows for the identification of the optimal production function among the 20 Italian regions. The best performing region is Tuscany (in the centre), followed by Sardinia and Sicily (in the South). In addition, Kumar et al. (2017) present an overview of the statistics on global e-waste generation and the sales of new electrical equipment and electronics in general. The total amount of e-waste produced has reached approximately 41 million tons in 2014 and increasing at a rate of 3–5% every year. A correlation between e-waste generated, gross domestic product and population of the country has also been explored that suggested that the GDP of any country has a direct correlation with the amount of e-waste produced by that country. The population of the country does not have a significant impact. The paper also describes the importance and benefits of recycling are emphasized while presenting the techniques currently used by the recycling facilities.

Milovantseva and Fitzpatrick (2015) analyze data from nine cases collected in 2012–13 via interviews and a survey of reuse organizations to identify the effects of these regulations on transboundary reuse activities, which respondents perceive as barriers to electronics reuse. Overall, three broad areas were identified in which regulations may directly influence the reuse organizations that participated in this study: (i) definitions, classification, operating procedures, and enforcement; (ii) evaluation of shipments; and (iii) requirement for functionality testing. These findings suggest that, contrary to the goal of encouraging reuse of discarded electrical and electronic equipment, in some cases regulations may be contributing to raising barriers for reuse organizations' business. To help eliminate these barriers, policy recommendations proposed in this paper include: appropriate legislative amendments; inclusion of issues related to reuse in the development of relevant national policies; establishment of a comprehensive international legislative database; creation of refurbishment operations close to the install base and integration of informal recyclers in the reuse sector; and an introduction of a regulated green e-waste transboundary channel.

2.2. Knowledge and Intention of managing E-waste

The concept of "knowledge" is a category locks where an understanding of the complex process that is capable of changing society (Karpov, 2017). Knowledge will change the way in which the standpoint of education would involve a priority person's socio-cognitive growth (Karpov, 2015). Knowledge is seen as one of the sustainable competitive advantage that should be owned by the company (Von Krogh et al., 2001). In the context of business, knowledge is able to create a new business process in order to create a superior performance (Wu et al., 2014).

Some research explained that the knowledge was able to increase interest in something (Arcury, 1990; Levine & Strube, 2012). Knowledge about harmful chemicals associated with the recycling of electronic waste treatment options and End-of-Life (EoL) for developing countries and developed countries (Tsydenova & Bengtsson, 2011). The true knowledge of electronic waste will be greatly impacted the interest of someone to behave. Hornik et al. (1995) explained that knowledge of the technical aspects of recycling can increase the motivation of individuals to recycle. Several studies come to the conclusion that "knowledge" about recycling, i.e. a separate sewage and trash is placed, is an important factor to explain the behavior of recycling (De Young, 1989; Schultz et al., 1995; Susilo, 2018).

H1: knowledge has a positive and significant effect on attitudes on E-Waste

2.3. Theory of Planned Behavior

Theory of Planned Behavior (TPB) is one of the theories that attempted to predict the behavior of someone in doing something. TPB is an extension of the Theory of Reasoned Action (TRA). In the TRA that the intention of a person is against behavior formed by two main factors, namely attitude toward the behavior and subjective norms (Fisbein & Azjen, 1975). Both of good attitudes and subjective norms, should be able to predict someone's interest and its impact on the performance of the behavior (Azjen, 1991; Head & Noar, 2013; Nugroho, et al., 2017). In TPB, in addition to attitudes and subjective norms, the driving factor of interest and behavior coupled with perceived control behavior (Azjen, 1991, 2005). As stated by Ajzen (1991) that TPB is suitable to describe any behavior that requires planning, such as entrepreneurship). Perceived behavioral control is the perception of the individual to control his powers with regard to certain behavior (Ajzen, 2005). These factors

according to individual perception refer to Ajzen about easy or hard it is degrading behavior. Attitude is a positive or negative evaluation of the individual to a particular behavior. Whereas subjective norm is the perception of a person against the social pressure to do or not do a certain behavior (Fishbein & Ajzen 1975).

This theory can be used to predict a person's behavior and interest in doing recycling. Basically, the attitude of somebody to love the environment will greatly impact on the interest in performing the behavior of green (Farida & Ardyan, 2015). Subjective norm is related to how well the others thought such behavior and whether their opinion (friend or family) affect the individual to behave in certain ways (Azjen, 1991). Subjective norm also greatly affects a person's interest in behaving (Azjen, 1991). People will be more likely to engage in a certain behavior, such as recycling, if their contact people believe it is the right thing to do (Philippsen, 2015). The perception of someone about whether doing something easy would greatly impact on behavior (Azjen, 1991). A person who perceives that do recycle it easy then it would have an impact on their behavior or interest in doing recycling.

H2: Attitude has a positive and significant effect on interest in managing e-waste

H3: Subjective norm has a positive and significant effect on interest in managing e-waste

H4: Perceived behavioral control has a positive and significant effect on interest in managing e-waste

H5: Interest someone positive influential and significant at the behavior of managing e-waste

3. Research Method

3.1. Sample and Respondents

Dissemination of the questionnaire was used to obtain the data. A questionnaire distributed to 200 respondents. From 200 respondents who is using e-waste there are 120 people or amounted to 80% of respondents-sex male and 80 people or amounted to 40% of the female sex. Most of respondents found on the requirement of 25 – 35 years old that is as much as 134 people with percentage of 67% of the respondents age categories, 36 – 46 years as many as 35 people or amounted to 17.5% and respondents aged 47 years as much as > 31 person or of 15.5%. Table 1 can be known that as much as 99 people or amounted to 49.5% attended to Senior High School, respondent as much as 87 people or 43.5% of educated scholars, the respondent as much as 21 people or 10.5% attended a diploma, respondents as many as 10 people or as big as 4.5% attended Junior High School, as many as 10 people or by 5% of respondents attended a postgraduate education. Moreover, as many as 81 people or amounted to 40.5% of respondents have monthly spending of IDR 2,000,000-3,000,000 (equal to 142-213 USD), as much as 79 people or amounted to 39.5% have monthly spending IDR 3,000,000- 5,000,000 (213-355 USD), as many as 28 people respondents or 14% have spending per month amounted to > IDR 5,000,000 (>355 USD) and r as many as 12 people or 6% respondents monthly have spending of IDR 1,000,000- 2,000,000 (71-142 USD). The explanation can be summarized in the table 1.

No	Characteristics	Frequency	Percentages
1	**Gender:**		
	Male	120	60%
	Female	80	40%
2	**Age:**		
	25 – 35 years old	134	67%
	36 - 46 years old	35	17.5%
	> 47 years old	31	15.5%
3	**Education Level:**		
	Elementary School	-	-
	Junior High School	9	4.5%
	Senior High School	99	49.5%
	Diploma	21	10.5%
	Bachelor Degree	87	43.5%
	Postgraduate	10	5%
4	**Monthly spending:**		
	<IDR 1,000,000 (71 USD)	-	-
	IDR 1,000,000 – 2,000,000 (71-142 USD)	12	6%
	IDR 2,000,000 - 3,000,000 (142-213 USD)	81	40.5%
	IDR 3,000,000 – 5,000,000 (213-355 USD)	79	39.5%
	>IDR 5,000,000 (>355 USD)	28	14%

Table 1. Characteristics of Respondents

3.2. Variable Measurement

Each item in this question in the study measured with a scale of 7, where 1 explains answers disagree while 7 explains the answers strongly agree. Table 2 shows the indicators developed in this research.

3.3. Analysis

In this study is using structural equation modeling analysis of PLS (SEM-PLS). To process data use WarpPls version 6. There are some things that are tested, among other things: (1) examine

No	Variable	Indicators
1.	Knowledge	a. Knowing the knowledge regarding the reduction of household equipment products related to electronic garbage b. Knowing the knowledge of usage back to the household equipment products related to electronic waste c. Knowing knowledge about recyclers back for the products household appliances related to electronic waste d. Knowing knowledge about waste of energy for household equipment products related to electronic waste
2.	Attitudes	a. Saving the household appliances which are already damaged, although it is not used again b. Using of electronic household appliances, while other equipment still stored warehouse c. Classifying good for household electronic waste that is recycled d. Giving satisfy for electronic household appliances damaged processed again by the company
3.	Subjective norms	a. Intended use electronic equipment waste returns households are still worth sharing b. Intend to do waste recycling electronics to household appliances. c. Intend to do the processing to turn garbage into energy household appliance
4.	Perceived Behavior Control	a. Thinking tools and materials that there is inadequate for processing electronic bins for household appliances b. Thinking there is no special place to process electronic waste for household appliances c. Thinking no special learning related with garbage processing electronics to household appliances d. Thinking there is no institution to accommodate junk electronics to household appliances e. Haven't feeling to the other party to accept the electronic garbage for household appliances
5.	Interest in Managing E-Waste	a. Intending to do waste recycling electronics to household appliances b. Intending to do the processing to turn garbage into energy household appliances
6.	Behavior Management of E-Waste	a. Choosing the household appliances that use the most energy-efficient b. Using household appliances with the lowest energy resources c. Using electronic household appliances with efficient power d. Always taking care of household electronic equipment in accordance with instructions from the company

Table 2. Measurement

the validity and reliability of instruments; (2) examine for goodness of fit; (3) examine the hypothesis that was built in this research.

4. Results

4.1. Validity and Reliability

Validity is to measure the precision and accuracy of a construct in performing the functions of its measures (Azwar, 1986). In this study, to test the validity of using the factor loading and the extrated the Average variance. The instrument is said to be valid if the value of the factor loading and AVE above 0.50 (Hair et al., 2010). Table 3 explains that the whole instrument is already said to be invalid because the value is already above 0.50.

Reliability which means the extent to which the results of a measurement has benefiting, rely on, stability, consistency, can be trusted (Azwar, 1986). In this study, measurement reliability using compositing reliability and cronbach alpha. It can be said as instruments have a high reliability if the value is above 0.60 (Hair et al., 2010). Table 3 explains that the whole instruments are reliable because the value is above 0.60.

Variable & Indicators	Factor Loading	AVE	Composite Reliability	Cronbach Alpha
Knowledges		0.612	0.862	0.786
P1	0.822			
P2	0.825			
P3	0.800			
P4	0.673			
Attitudes		0.529	0.816	0.698
S4	0.760			
S5	0.840			
S6	0.665			
S7	0.625			
Subjective Norms		0.584	0.799	0.618
NS2	0.500			
NS3	0.881			
NS4	0.865			
PBC		0.523	0.812	0.691
PBC1	0.577			
PBC2	0.714			
PBC3	0.785			
PBC4	0.797			
Intention		0.731	0.845	0.632
I3	0.855			
I4	0.855			
Behavior		0.596	0.854	0.769
PG2	0.745			
PG3	0.870			
PG4	0.798			
PG5	0.658			

Table 3. Factor Loading, AVE, Composite Reliability and Cronbach Alpha

Before examining the hypothesis, the alignment of the data with a model that is built must be fit. Goodness of fit in the PLS use some measurement indicators. The value of the average path's (APC) is of 0.279 with P < 0.001, the average R-squared (ARS) is of 0.203 with P < 0.001, and Average adjusted R-squared (AARS) is 0.193 with P < 0.001. Moreover, the value of average block VIF (AVIF) is 1.127, and this is acceptable if <= 5 with ideal value of <=3.3. The value of average full collinearity VIF (AFVIF) is 1.197, and this is acceptable if <= 5 with ideal value of < = 3.3. The value of Tenenhaus GoF (GoF) is 0.348 >= 0.1 with small, medium, large value of >= 0.25>= 0.36. Moreover, the value of Sympson's paradox ratio (SPR) is 0.800, and this is acceptable if > = 0.7 with the ideal value of = 1. The value of R-squared contribution ratio (RSCR) is 0.898, and this is acceptable if > = 0.9 with the ideal value of = 1. In addition, the statistical suppression ratio (SSR) has the value of 1,000, making this acceptable if > = 0.7. The value of nonlinear bivariate causality ratio (NLBCDR) is 1,000, making this acceptable if > = 0.7. It can be concluded that the entire measurement goodness of fit is already good, so the data is already fit with the model created.

In this study, there are proposed 5 hypotheses. From the five hypotheses there is only one hypothesis were rejected namely H3 (β = -0.118; p = 0.045), whereas H1 (β = 0.201; p = 0.001), H2 (β = 0.291; p < 0.001), H4 (β = 0.462; p < 0.001), and H5 (β = 0.322; p < 0.001) accepted. The results of measurements of the hypothesis can be seen in table 4.

Hypothesis	β	ρ	Verification
H1: Knowledge → Intention	0.201	p=0.002	Accepted
H2: Attitude → Intention	0.291	p<0.001	Accepted
H3: Subjective Norms → Intention	-0.118	p=0.045	Rejected
H4: Perceived Behavior Control → Intention	0.462	p<0.001	Accepted
H5: Intention → Behavior	0.322	p<0.001	Accepted

Table 4. Hypotheses Examination

In this research, knowledge has a positive and significant effect on the interest of someone to care about the e-waste. This research shows that the attitude was able to increase the interest of someone to manage e-waste. In the study, subjective norm is not able to increase the interest of someone to manage e-waste. The influence of subjective intention on norms is negative. It is possible because it is those who provide recommendations are not the right person in the context of the e-waste management. Moreover, this study also found that perceived behavioral control would be able to improve a person's interest in managing e-waste.

5. Discussion

Electronic waste or waste is one of the growing problems in the world (Saoji, 2012). E-waste is composed of various components, some of which contain toxic substances that can have an adverse impact on human health and the environment if not handled correctly. E-waste contains more than 1000 substances, which includes various materials such as metal, plastic and glass (Vadoudi et al., 2015). This danger arises because the process of recycling and disposal are not good in managed (Pinto, 2008). Recycling is the process by which the material that has been used previously collected, processed, rebuilt and reused (Rudnik, 2007).

The knowledge that e-waste was able to make of diseases greatly affect one's attitude on e-waste (Sivasthanu, 2016). Hornik et al. (1995) explained that knowledge is the most effective Predictor to affect his desire do recycling. People must have awareness or knowledge related to e-waste. E-waste is a product that is very dangerous. Even the base material is primarily material that is able to cause various types of the deadly disease to humans. Therefore, the correct knowledge is about e-waste badly more interesting for someone to manage e-waste.

The attitude is positive and negative assessment of someone about something (Azjen, 1991), in this case assess e-waste. The higher a person's stance on e-waste, then the higher is also of interest to interest someone to manage e-waste. The results of this research are the same as the research done by Philippsen (2015), where a person who has a positive attitude to want to recycle used items will have an impact on their interest in conducting employee Administration of e-waste.

This finding about the positive influence of perceived behavioral control on the interest in managing e-waste is in line with the theory of TPB (Azjen, 1991), where a person who has the optimism granular management of e-waste, it will have an impact on interest to manage e-waste. Research conducted by Philippsen (2015) had different results where the perceived behavior control is not able to increase interest in doing recycling. The respondents in the study are students where students are

not a people who delight in doing recycling. Research shows that if someone found it easy to do the management of e-waste then it will bring up the person's interest to do the management of e-waste.

The theory of planned behavior to explain that someone who is interested in doing something then it will have an impact on the person's behavior (Azjen, 1991). The results of this study make it clear that a person who is interested to manage e-waste properly then it will have an impact on their behavior. Bring up someone's interest is an important part of enabling the person performing a particular behavior. Interest in managing e-waste means a person has a strong desire to perform all activities related to the management of e-waste. A strong desire is what will impact the real behavior of the person in managing e-waste. People tend to be doing activities such as do not dump e-waste in vain, trying to do a variety of ways in order to recycle e-waste, and a variety of other behaviors.

Based on the findings, this study suggests for forming community who has the desire to manage e-waste. Community that built that made the people in it will give a variety of input is more positive impact on the other members. Within the community there is an activity based on knowledge-sharing. Within the community there is motivation. The attitude of the people in the community must be positive. This will speed up a member to perform various behaviors in the management of e-waste, such as jointly collect e-waste, mutual reminding each other, build networks more broadly, and work together with an industry that has a concern in the management of e-waste. The community should also cooperate with the Government, and other communities and industries to create larger recycling movement again.

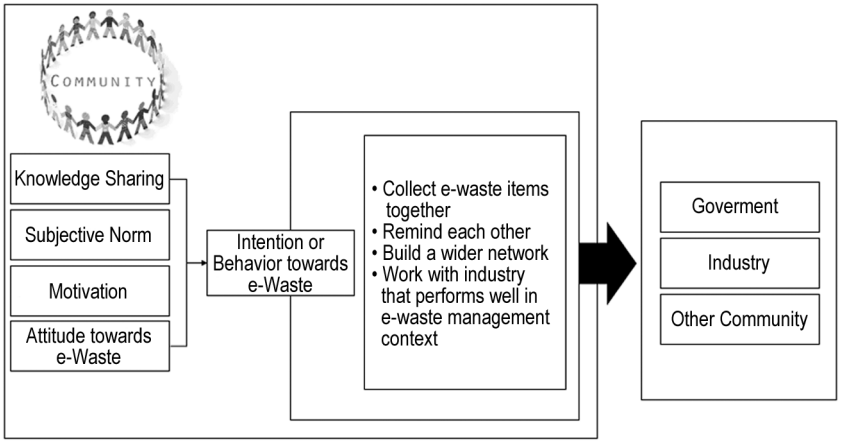


Figure 1. E-Waste Management through Community Involvement

6. Conclusion

This research highlights some important considerations regarding the effects of behavioral aspects on the intention of managing e-waste. First, the results of this research show that the subjective norm has the negative effect on a person's interest in managing e-waste. Second, increase knowledge of someone in e-waste management should increase the promotion of e-waste management should be more extensible. A growing number of communities have an awareness of the importance of managing e-waste, the more the society moved in the management of e-waste.

The limitations in this research are the research sample which is still within the scope of Central Java. For upcoming research suggested observing the areas of research, namely Indonesia. The other weakness is not focusing on the characteristics of certain respondents. For upcoming research expected to classify respondents based on certain things, such as level of education. After being grouped with the same model then compared between groups, its results are same or there is a difference.

References

[1] Arcury, T. (1990). Environmental Attitude and Environmental Knowledge. *Human Organization*, 49(4), 300-304.

[2] Awasthi, A. K., & Li, J. (2017). Management of electrical and electronic waste: A comparative evaluation of China and India. *Renewable and Sustainable Energy Reviews*, 76, 434-447.

[3] Awasthi, A. K., Cucchiella, F., D'Adamo, I., Li, J., Rosa, P., Terzi, S., . . . Zeng, X. (2018). Modelling the correlations of e-waste quantity with economic increase. *Science of the Total Environment*, 613-614, 46-53.

[4] Azjen, I. (1991). The Theory of Planned Behavior. *Organization Behavior and Human Decision Process*, 50, 179-211.

[5] Azjen, I. (2005). *Attitudes, Personality and Behavior* (2 ed.). England: Open University Press.

[6] Azwar, S. (1986). *Reliabilitas dan Validitas: Interpretasi dan Komputasi*. Yogyakarta: Liberty.

[7] Bakhiyi, B., Gravel, S., Ceballos, D., Flynn, M. A., & Zayed, J. (2018). Has the question of e-waste opened a Pandora's box? An overview of unpredictable issues and challenges. *Environmental International*, 110, 173-192.

[8] Cao, J., Lu, B., Chen, Y., Zhang, X., Zhai, G., Zhou, G., ... & Schnoor, J. L. (2016). Extended producer responsibility system in China improves e-waste recycling: Government policies, enterprise, and public awareness. *Renewable and Sustainable Energy Reviews*, 62, 882-894.

[9] De Young, R. (1989). Exploring the difference between recyclers and non-recyclers: The role of information. *Journal of Environment Systems*, 18(4), 341-351.

[10] Farida, N., & Ardyan, E. (2015). Repeat purchase intention of Starbucks consumers in Indonesia: A Green Brand Approach. *Market/Trziste*, 27(2), 189-202.

[11] Favot, M., & Grassetti, L. (2017). E-waste collection in Italy: Results from an exploratory analysis. *Waste Management*, 67, 222-231.

[12] Fisbein, M., & Azjen, I. (1975). *Belief, attitude, intention and behavior*. Reading, MA: Addison-Wesley.

[13] Golev, A., Schmeda-Lopez, D. R., Smart, S. K., Corder, G. D., & McFarland, E. W. (2016). Where next on e-waste in Australia? *Waste Management*, 58, 348-358.

[14] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7 ed.). New York: A Global Perspective.

[15] Head, K. J., & Noar, S. M. (2013). Facilitating progress in health behaviour theory development and modification: the reasoned action approach as a case study. *Health Psychology Review*, 8(1), 34-52.

[16] Herat, S., & Agamuthu, P. (2012). E-waste: a problem or an opportunity? Review of issues, challenges and solutions in Asian countries. *Waste Management*, 30(11), 1113-1129.

[17] Hornik, J., Joseph, C., Madansky, M., & Narayana, C. (1995).

Determinants of recycling behavior: A synthesis of research results. *Journal of Socio-Economics*, 24(1), 105-127.
[18] Imran, M., Haydar, S., Kim, J., Awan, M. R., & Batti, A. A. (2017). E-waste flows, resource recovery and improvement of legal framework in Pakistan. *Resources, Concervation, and Recycling*, 125, 131-138.
[19] Karpov, A. O. (2015). Formation of the Modern Concept of Research Education: from New Age to a Knowledge Society. *Procedia-Social and Behavioral Sciences*, 213, 439-447.
[20] Karpov, A. O. (2017). The problem of separating the notions of “knowledge” and “information” in the knowledge society and its education. *Procedia-Social and Behavioral Sciences*, 237, 804-810.
[21] Kumar, A., Holuszko, M., & Espinosa, D. C. R. (2017). E-waste: an overview on generation, collection, legislation and recycling practices. Resources, *Conservation and Recycling*, 122, 32-42.
[22] Levine, D. S., & Strube, M. J. (2012). Environmental attitudes, knowledge, intentions and behaviors among college students. *Journal of Social Psychology*, 152(3), 308-326.
[23] Milovantseva, N., & Fitzpatrick, C. (2015). Barriers to electronics reuse of transboundary e-waste shipment regulations: An evaluation based on industry experiences. Resources, *Conservation and Recycling*, 102, 170-177.
[24] Nugroho, A. H., Bakar, A., & Ali, A. (2017). Analysis of technology acceptance model: Case study of Traveloka. *Arthatama Journal of Business Management and Accounting*, 1(1), 27-34.
[25] Philippsen, Y. (2015). *Factors influencing students' intention to recycle*. University of Twente.
[26] Pinto, V. (2008). E-waste Hazard: The Impending Challenge. *Indian Journal of Occupational and Environmental Medicine*, 12(2), 65-70.
[27] Rudnik, E. (2007). *Compostable Polymer Materials*. USA: Elsevier Science.
[28] Saoji, A. (2012). E-waste management: An emerging environmental and health issue in India. *National Journal of Medical Research*, 2(1), 107-110.
[29] Schultz, P., Oskamp, S., & Mainieri, T. (1995). Who recycles and when? A review of personal and situational factors. *Journal of Environment Psychology*, 15(2), 105-121.
[30] Sivasthanu, B. (2016). User's perspective: Knowledge and attitue towards e-waste. *International Journal of Applied Environment Sciences*, 11(2), 413-423.
[31] Step (2014). *One GLobal Definition of E-Waste. Solving the E-Waste Problem*: United Nation University, Bonn.
[32] Susilo, D.E. (2018). The Effects of Corporate Social Responsibility on Corporate Value. *Arthatama Journal of Business Management and Accounting*, 2(1).
[33] Tsydenova, O., & Bengtsson, M. (2011). Chemical hazards associated with treatment of waste electrical and electronic equipment. *Waste Management*, 31(1), 45-58.
[34] Vadoudi, K., Kim, J., Laratte, B., Lee, S.-J., & Troussier, N. (2015). E-waste management and resources recovery in France. *Waste Management & Research*, 33(10), 919-929.
[35] Von Krogh, G., Nonaka, I., & Aben, M. (2001). Making the most of your company’s knowledge: A strategic framework. *Long Range Planning*, 34, 421-439.
[36] Wei, L., & Liu, Y. (2012). Present status of e-waste disposal and recycling in China. *Procedia Environmental Sciences*, 16, 506-514.
[37] Wu, I.-L., Chuang, C.-H., & Hsu, C.-H. (2014). Information Sharing and Collaborative Behavior in Enabling Supply Chain Performance: A Social Exchange Perspective. *International Journal of Production Economics*, 148, 122-132.

Economics Restructuring Model on the Base of Fuel and Energy Complex Clustering

Nikolay Konstantinovich BORISYUK[1], Ekaterina Ivanovna KUTSENKO[1], Lyudmila Vladimirovna KIRKHMEER[1], Lyubov Yurevna BEREZHNAYA[1*]

[1]Management Department, Orenburg State University, Russia; E-mail: management@mail.osu.ru
*Corresponding author: 105/42 ul. Bolshaya Sadovaya, 460018 Orenburg, Russia; E-mail: Berezhnayal@meta.ua

Abstract

Thematic justification: The topicality of the problem in hand is lied in developing of economics restructuring model on the base of fuel and energy complex clustering under the conditions of financial and economic crisis caused by Occident sanctions, fall in oil prices and a decline in the ruble and also because of immaturity of theoretical and methodological aspects of the problem under study. Goal of Research: The goal of the article is concluded in developing of economics restructuring model on the base of fuel and energy complex clustering of the region and working out scientifically grounded offers in its realization. Research Methods: In the research authors used methods of theoretical and engineering character: analyses, synthesis, clustering; scientific classification method; dialectical method of enquiry, post event analyses, statistic information processing, graphic results interpretation, modeling, extrapolation. Research results: In the article there was presented retrospective analysis of Orenburg region fuel and energy complex developing there was developed structure logical diagram of economics restructuring on the base of fuel and energy complex clustering and the flow diagram of creation of gas chemical cluster at the premises of gas industry enterprises; there were defined the advantages of clustering for regional economics developing. Practical significance: The offered model is focused on economics restructuring as one of the exit conditions out of financial crisis and oriented on forming of regional clusters with the use of available advantages of fuel and energy complex.

Keywords: *fuel and energy complex; region; economics restructuring model; gas chemical cluster.*

1. Introduction

In the emerging situation, the search for a key link in the system of its interrelated elements through which it is possible to give an impetus to stabilization becomes particularly important in determining the strategy of economic restructuring. In our opinion, the way out of this situation is seen in a more effective and comprehensive use of the fuel and energy potential, especially in those territorial and economic agglomerations in which it occupies a dominant position.

At the same time many researchers make unreasonable conclusions about the rejection of the raw material direction of the development of the Russian economy. It is impossible to stop the raw material direction in an instant as well as to introduce non-commodity approaches to the development of the economy.

Boris Titov, authorized by the President of the Russian Federation for the Protection of Entrepreneur Rights supports this postulate: “Already today, an emergently “fighting the fire” in the economy and the financial market, it is necessary to lay the foundation for the non-resource future of Russia with support for human capital, entrepreneurship, private initiative, modern production. We need new ideas, new approaches and new measures to build a new economy" (Titov, 2016).

As it can be seen from the quotation the new model of the Russian economy development based on the restructuring process should function and operate on the principles of a free market, private initiative, developed competition, but with the state implementing an effective industrial policy.

On the gradual transition to a new model of economic development in connection with the evolving situation caused by the sanctions applied by Western countries, the fall in oil prices, the Chairman of the Central Bank of Russia Elvira Nabiulina: "The former model of the economy based on the export of raw materials and stimulation of consumption including through consumer lending has been exhausted. However, in the absence of structural changes the growth rate of the economy will remain below 2% ... Russia needs a new savings and investment economic model within which investments will "transform" into the savings of the population" (Nabiulina, 2016).

At the same time the transition of the Russian Federation's economy to the investment growth model became the basis of the targeted scenario of Russia's socioeconomic development until 2030 (MED, 2016).

The main points of this model of economic growth are worthy of attention in order to achieve macroeconomic and social stability. In particular it is emphasized that for dynamic long-term economic growth the following conditions should be ensured which today determine the competitive advantages of the Russian economy:

- relatively high labor costs;
- relatively low level of technological and institutional development;
- availability of natural resources.

Based on the foregoing we can conclude that the basis for a new model of economic development should determine the availability of natural resources as a competitive advantage and compensate for the impact of the first two factors.

Thus the analysis of theoretical approaches to the restructuring of the Russian economy, the development of models for its functioning under the new economic conditions, exacerbated

by the sanctions of Western countries, the fall in oil prices, the common criterion, the key link in the studies of most authors, is the use of natural resources as the locomotive of the economy. It is these views that confirm the findings of the research conducted by the authors of the article, which will analyze the state and development of the fuel and energy complex of the Orenburg region, consider the theory and practice of clustering the fuel and energy complex, the strategy of its use as a key element of economic restructuring region, in which the actuality of the subject matter of this article actually lies.

All of the above requires a deeper and more systematic study of both the theoretical and applied aspects of this problem – the restructuring of the economy based on the clustering of the fuel and energy complex in the region. Consequently, in the conditions of the formation of new economic relations, research and the creation of innovative forms of organization and management, the identification of advantages and disadvantages, their interaction at all levels of the hierarchy including interaction with local authorities, are required.

2. Literature Review

Starting to develop the topic of FEC cluster forming at the region level it's necessary to highlight some works in this field. Thus, these problems were researched by such Russian scientists as Zakharchenko (2015) and Ermakova (2006, 2013) and also following researchers devoted their works to these problems: Minzov (2016), Pogrebnyak (2010), Kuznetsova (2015), Nekrasov and Sinyak (2007). Forming and management of clusters are shown in works by Sobolyeva (2014), Korchagina (2014), Bergman, and Feser, (1999), Enright (1996), Porter (1990), Göran Lindqvist Christian Ketels Örjan Sölvell (2003).

It's necessary to mention also the authors of this article – Borisyuk N.K., Davidov (1997); Borisyuk (2009); Borisyuk and Ermakova (2015); Bistrov (2016); Tsipin, Ovsyannikov (2016); Borisyuk, Likhachyov, Kutsenko and others. (2017), Chistik, Nosov, Tsypin, Ivanov, Permjakova (2016).

3. Methodology

In this research the authors used theoretical and applied methods: analyses, synthesis, generalization; scientific classification method; dialectical method of enquiry; post-even analysis; statistic information processing; modeling; extrapolation.

The research was done in four stages:

- The first stage included the analysis of theoretical positions, existing concepts and views in the scientific and applied literature on the research problem, as well as highlighting the problem, formulating the goal and setting research objectives, choosing methods;
- The second stage of the study consisted in assessing the state and peculiarities of the development of the fuel and energy complex of the Orenburg region; the development of a structural and logical scheme for economic restructuring based on the clustering of the fuel and energy complex in the region; creation of a gas-chemical cluster model based on gas industry enterprises of the regional economy;
- At the third stage, the experimental work was completed, theoretical and practical conclusions were refined, the results obtained were generalized and systematized.
- At the final stage, scientifically based recommendations on the creation of a gas chemical cluster based on the enterprises of the gas industry of the regional economy were formulated; generalized and systematized theoretical and practical conclusions of the study.

4. Case Studies

The Orenburg region occupies the territory of 123,7 thousand square meters and is located at the junction of Europe and Asia and has borders with the subjects of the Russian Federation – the Republics of Bashkortostan, Tatarstan, Chelyabinsk and Samara regions, as well as the state border with the Republic of Kazakhstan. Of all the subjects of the Russian Federation, the Orenburg region has the longest section of the Russian-Kazakh border – about 1.7 thousand km.

In terms of reserves and mining the region takes a leading place among the regions of Russia. Over 2,500 deposits of 75 types of minerals have been discovered on its territory. The region accounts for more than 4% of oil production in the all-Russian production sector, about 3% of natural gas production, and almost 2% of electricity production (Statistical Digest, 2017).

The volumes of natural gas, oil and gas condensate production, electricity production and consumption are shown in Table 1.

Index	Years								
	1990	1995	2000	2005	2010	2014	2015	2016	2017
Natural and associated gas, mln m^3	41941	32379	25874	21030	21073	20387	19400	18306	17185
Oil, including gas condensate, thousand tons.	10345	8687	9067	17272	22292	22677	21800	20837	20069
The volume of oil refining, thousand tons.	6765	n.i.	4328	3690	5133	5938	5527	4546	4743
Depth of oil refining,%	56,80	n.i.	57,50	57,80	60,97	66,04	72,24	84,38	84,14
Electricity production, mln. KWh.	23900	18713	17228	14800	17998	17698	15361	12581	11848
Electricity consumption, million kWh.	16852	14136	14400	14799	16098	15514	15515	15756	n.i.
Note: no information									

Table 1. Dynamics of production of fuel and energy resources of the Orenburg

The economy of Orenburg region is included in the system of world economic relations of the country. Geography of trade contracts of Orenburg enterprises and organizations covers more than 80 countries. In 2014, in comparison with 2000 foreign trade turnover was increased in 2.2 times and exceeded 4.2 billion US dollars, and calculated per one citizen of the region amounted to 2.1 thousand US dollars (Government Portal, 2016).

Proceeding from the foregoing, it seems expedient to consider in detail the fuel and energy resources of the Orenburg region, assess the prospects for their more effective use, including the formation of an oil and gas chemical cluster.

The Orenburg oil and gas chemical complex is represented by a complete set of technologically related enterprises from gas production to its processing into commercial gas and related products (Figure 1).

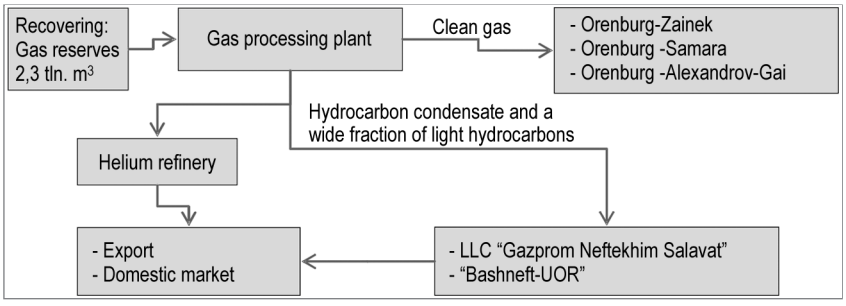


Figure 1. Production, processing and consumption of gas in the region

The basis of the complex is the Orenburg oil and gas condensate field, which was discovered by geologists in 1966. Gas-bearing rocks lie at a depth of 1400-1900 meters. The maximum capacity of productive horizons is 500 meters. The initial gas reserves were approved in the amount of 1.8 trillion. m^3. Then, in the process of development and supplementary exploration, they were brought up to 2.3 trillion. m^3.

The gas composition of the field includes methane (about 83%), ethane (about 5%), propane (more than 1.5%), hydrogen sulfide (1.3 to 4%), carbon dioxide (1.34%), nitrogen (more than 4%). The content of liquid hydrocarbons is about 100 cm^3 per cubic meter of gas. Condensate more than 90% consists of gasoline fractions and is characterized by high sulfur content (Borisyuk, 2009).

This field differs from similar ones with a number of features:

- presence of hydrogen sulphide and carbon dioxide in the gas, which causes the aggressively corrosive properties of the gas in relation to the metal;
- low reservoir gas temperature (+ 29 °C) while at other oil and gas condensate fields at similar depths the temperature is + 50-60 °C. This circumstance combined with high pressure (203 atmospheres) and the presence of liquid hydrocarbons causes serious complications in gas production technology – the formation of hydrates.

In 1974 the first stage of the gas processing plant was commissioned, in 1975 – the second, in 1978 – the third. For a full capacity of 45 billion cubic meters of gas per year the gas complex was launched in 1978. The result of processing of gas and hydrocarbon condensate are the following commodity products: fuel gas, sulfur, a wide fraction of light hydrocarbons.

Purified and drained gas from the plant is supplied to the Orenburg-Zainek, Orenburg-Samara, Bashkortostan gas pipelines along the Orenburg-Sovkhoznoye gas pipeline, to the Central Asia-Center via the Orenburg-Alexandrov-Gai gas pipeline.

Stabilized hydrocarbon condensate and a wide fraction of light hydrocarbons through separate pipelines are pumped to LLC Gazprom Neftekhim Salavat and Bashneft-UOR, liquid ethane through the Orenburg-Kazan gas pipeline to the Kazannefteorgsintez refinery. The gas processed at the plant through main gas pipelines is sent to Zainek, Samara, Bashkortostan, to the Central Asia-Center gas pipeline system.

Another valuable and unique product of the Orenburg gas is helium whose content in the gas is negligible – 0.055%. But taking into account the scale of the deposit and its potential this is one of the largest helium deposits not only in Russia but also in the world. The construction of the helium plant started in 1974 was completed in 1989. At present the Orenburg Helium Plant is the main helium producer in Russia and supplies it not only to the domestic market but also to the countries of Western Europe.

As noted above the Orenburg region occupies a significant place in the total volume of oil production in Russia. At present there are 168 deposits on the balance sheet of mining companies. Since the beginning of development over 640 million tons of oil have been extracted in the region. At the same time the degree of oil recovery from the explored reserves is more than 50% and the degree of explorations of the initial reserves is 64.8%. Since 2010 the total annual oil production in the region has reached 20 million tons or more (Borisyuk, 2015).

The oil refining industry of the Orenburg region is represented by the public joint-stock company "Orsknefteorgsintez". Since December 2005 PJSC "Orsknefteorgsintez" is part of the vertically integrated oil holding Rusneft one of the ten largest oil and gas companies in Russia. The volume of annual oil refining for the last five years has stabilized and on average exceeds 5.5 million tons and the processing depth has increased in 2015 to 72.24% (in 1990 – 56.8%). Currently PJSC "Orsknefteorgsintez" is actively upgrading the production process aimed at increasing the depth of oil refining and improving the quality of products (Figure 2).

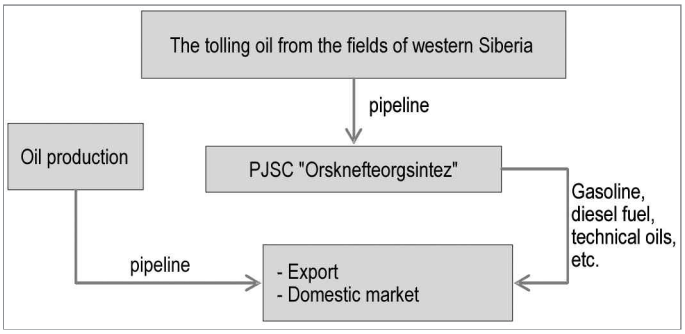


Figure 2.
Production, processing and consumption of oil in the region

In the Orenburg region significant electric power is concentrated and electricity production exceeds its consumption. There are five large power plants in the region: the Iriklinskaya hydroelectric power station and the state regional electric power station the Kargalinskaya, Orskaya and Sakmara thermal power plants. The installed capacity of the power system of the region exceeds 3636 MW (Figure 3).

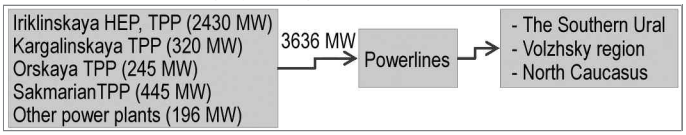


Figure 3.
Production and consumption of electricity in the region

The power of the region is connected by power lines of 220-500 kV. with regional power systems of the Southern Urals, the middle Volga and the North Caucasus.

Another energy resource of the region is the brown coals of the Tyulgan and Khabarovskoye fields which do not require large resource inputs for the development of the quarry (Figure 4). For the time being only the Tulgan deposit is under development. A distinctive feature of the coals of this deposit is a high content of humic acids in them reaching 71-73% for combustible mass or 50% for dry coal and an increased bitumen content (13.9-14.8%) and primary tar (58.5%) the wax part is 41.5% (Borisyuk, 1997). According to the conclusion of specialists based on the technological tests carried out the coals of the Tyulgan deposit can be used not only as energy and household fuels but also as raw materials for the chemical industry.

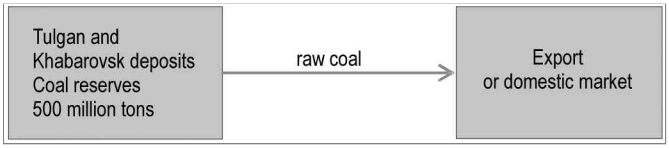


Figure 4. Production, processing and consumption of brown coal in the region

According to the presented scheme there is no coal processing in the region therefore we propose to use it as energy and domestic fuel as well as to provide for the possibility of deep processing of coal through its pyrolysis to produce generating gas some types of liquid fuel and related products. In particular, on the basis of the complex of extraction and deep processing of brown coal we consider it promising to create two modular plants: firstly a plant for the production of mountain wax (3,000 tons per year) and active humate fertilizers (7.44 thousand tons per year); secondly, a smokeless briquettes plant (1 million tons per year).

Summarizing the above mentioned it can be concluded that the Orenburg region has a significant fuel and energy potential, which, with its effective use, can stimulate structural reorgani-

Author	Definition
Porter M. (1990)	An industrial cluster is a set of industries connected through a chain of buyers - the supplier or supplier - the buyer, or through common technologies, common procurement channels or distributions, or general labor unions.
Enright M.J. (1996)	Regional clusters are industrial clusters in which the participating firms are in close proximity to each other.
Bergman E.M., Feser E.J. (1999)	Industrial clusters are a group of commercial enterprises and non-profit organizations for which membership in a group is an important element of the individual competitiveness of each member of the firm.

Table 2. Definition of a cluster

zation and development of the region's economy as a whole. In our opinion, such a market model for structural reforms in the fuel and energy sector could be diversification of production based on cluster policy.

Theoretical developments of scientists present various conceptual definitions that characterize clusters according to certain priorities of their functioning (Table 2).

A distinctive feature of regional industrial clusters is the location of their participating firms within the same agglomeration for cities with an average population of up to 1 million people.

Cluster as an object of economic agglomeration of interrelated enterprises in some territory, is known since the time of handicraft production. At the same time, the emergence of the cluster approach (1830-1890) economic science owes to A. Marshall, who himself called them localized industries (Marshall, 1993).

The foundations of the cluster concept were laid at the beginning of the 19th century in works on the economics of the agglomeration F.Fon Thunen and his followers V.Lownhardt and A. Weber who studied the territorial location of enterprises in the economic space relative to sources of raw materials and markets, as well as the factors affecting it (Tyunen, 1926, Weber, 1926).

The prospective variant of development of the economy of the Orenburg region on the basis of clustering of the gas chemical complex is presented in Table 3.

Basic enterprises in the direction of gas chemistry cluster development	Cluster Members	Directions of production organization
On extraction and transportation of gas and gas condensate.	In cooperation with the enterprises of mechanical engineering, chemical and metallurgical industry, scientific research institutions, the government of the Orenburg region.	Organization of production of corrosion-resistant equipment and wrist parts for gas fields of OMCC, including products under the import substitution program.
Gas Processing Plant.	Organization of new productions in cooperation with chemical enterprises by small and medium-sized enterprises, educational and research institutions, agricultural organizations, the government of the Orenburg region.	The organization of production of products from sulfur, condensate and other components of gas raw materials.
Helium plant	Organization of new ethane synthesis production facilities in cooperation with petrochemical enterprises, small and medium-sized enterprises, research institutions, the government of the Orenburg region.	Organization of polyethylene production and its products: pipes, fittings and other products for gasification of settlements.
On transportation of a gas-condensate mixture	In cooperation with the enterprises of machine building, metallurgy, research institutions, the government of the Orenburg region.	Organization of production of corrosion-resistant spare parts and components, including products under the import substitution program.

Table 3. Scheme of organizational and production development of the gas chemical cluster of the Orenburg region

The main approaches and stages of cluster formation in the process of economic restructuring are presented in Figure 5 in the form of a structural-logical scheme.

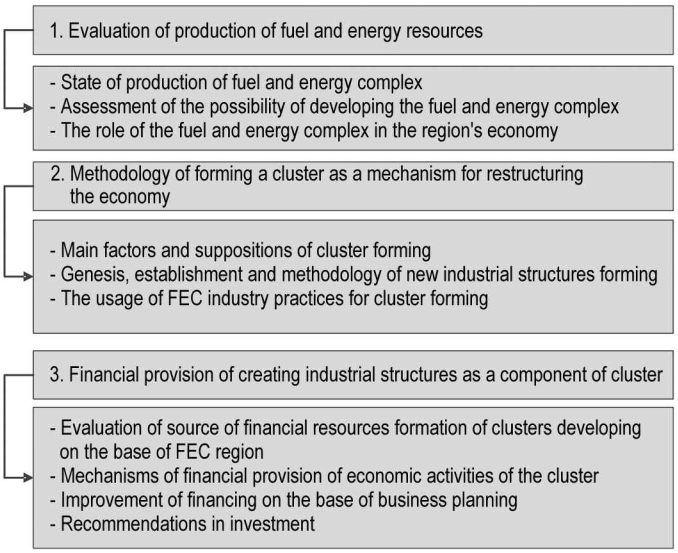


Figure 5. Structural-logical scheme of economic restructuring on the basis of clustering of the fuel and energy complex of the region

5. Discussions

The construction of clusters is connected with the expediency of combining production business projects in a specific technological area with the aim of producing new products. The main goal of integration transformations is to bring innovative laboratory technologies to new systems of activity and practice. The formation of industrial clusters is aimed at creating new forms of labor organization, by involving innovative technologies and investments in production.

In this section of the article, it is planned to consider approaches and possible directions of clustering of the fuel and energy complex as a key element in the restructuring of the region's economy.

In a broad sense, the concept of "cluster" is a network of economic agents, infrastructure elements, research institutes integrated into the process of creating added value. Consequently, we can give the following definition of an industrial cluster: it is a group of geographically integrated enterprises technologically and on a raw material basis of related organizations operating in the same sectoral (multisectoral) structure of the economy and mutually complementary.

Industrial, as well as other cluster systems, are characterized by the following features:

- ❑ presence of a leading enterprise that determines the economic, innovative and other development vectors;
- ❑ geographic localization of key participants;

- ❑ stability of economic relations;
- ❑ coordination of interaction within production and innovation programs;
- ❑ diversified orientation of products: domestic consumption, export and import substitution.

Currently more than half of the enterprises in the USA work according to the production model in which cluster members are located in the same region and make maximum use of its natural, human and innovation potential, which in our opinion is also acceptable for the conditions of the Orenburg region.

Since 2012, in accordance with the Strategy of Innovative Development for the period until 2020 (Ministry of Economic Development, 2012), a program of supporting innovative territorial clusters is being implemented. The criteria and procedures for the selection of clusters adopted and the mechanisms for their support generally correspond to similar European programs.

Basically, territorial clusters are concentrated in the European part of the country. The main number of territorial clusters is located in Privolzhsky (36%), Central (24%) and Siberian (20%) federal districts, which are characterized by a high level of innovation activity. The analysis of cluster projects has shown that in accordance with their sectoral affiliation they can be formed in the following areas: "Nuclear and Radiation Technologies", "Production of Aircraft and Spacecraft, Shipbuilding", "Pharmaceuticals, Biotechnology, Biomedicine and Medical Industry", "New Materials", "Chemistry and petrochemistry", "Information technology and electronics" (RBC, 2014).

The cluster approach assumes an indirect impact on the restructuring of the entire economy of the region, on creating conditions for business development, including in industries not related to the specialization of the leader enterprise. It should also take into account the fact that each participant in accordance with its Charter, development programs, corporate documents has the right to solve its local tasks. At the same time, within the region, local authorities together with business can find common approaches and points of interaction in solving common tasks when clustering the fuel and energy complex. This refers to the cooperation of production, research organizations, general and professional education, local and regional authorities.

As already noted the formation of the cluster is associated with the expediency of combining within a single agglomeration specific business projects, fundamental developments in the production of new products related to industry.

At the same time, the creation of clusters includes the following major socioeconomic and financial principles:

- ❑ creation of new income zones, including using the productive potential of the fuel and energy complex;
- ❑ the cultivation of new model solutions for regional economic restructuring, including the creation of new jobs;
- ❑ formation of the transfer mechanism between fundamental science and industrial production of new technological solutions;
- ❑ ensuring a continuous process of retraining managers and developers of the cluster being formed, since the cluster organization of industry stimulates the creation of new forms of labor organization, the formation of positive trends in the socio-economic development of the region.

Using the production potential of the gas industry in the region's economy, involving business and local authorities, it is possible to organize a cluster, and in its composition a number of new productions producing products using the raw materials resources of the gas complex.

In favor of creating a gas chemical cluster, the following arguments stemming from the analysis of the fuel and energy complex of the Orenburg region:

- ❑ geographical location of the enterprises of the complex;
- ❑ availability of necessary production potential;
- ❑ significant raw material base;
- ❑ the possibility of increasing the volume of exploration and increment of hydrocarbon reserves;
- ❑ Integration of financial, scientific, production and innovation potentials;
- ❑ increase efficiency and focus of resource use;
- ❑ creation of a full cycle of raw materials processing;
- ❑ solution of social and economic problems of the region.

The advantages of cluster formation for regional development are:

1) For administration:
- ❑ increase in the taxable base and the number of taxpayers;
- ❑ the possibility of making organizational and economic decisions in the cluster, acting as an equal partner;
- ❑ creation of effective tools for interaction with business;
- ❑ strengthening and development of the economic situation in the region.

2) For small and medium-sized enterprises:
- ❑ a significant reduction in the barriers to the organization of sales of products, the supply of raw materials, materials and the attraction of labor;
- ❑ use the reputation of the cluster to gain new opportunities for access to financial resources.

It should be noted that the real benefits of cluster development can not be obtained immediately, often they are possible not earlier than in 3-5 years. Proceeding from this, successful implementation of cluster projects can be realized only if there is a regional strategy.

6. Conclusion

Taking into account the above mentioned the authors of the article consider it expedient to formulate the following conclusions and proposals:

1. In the context of the ongoing global financial and economic crisis a more effective and comprehensive use of the potential of enterprises of the fuel and energy complex is seen as a key element in economic restructuring, especially in the regions in which it dominates.
2. The article is generalized and formulated arguments in favor of creating a gas-chemical cluster based on the analysis of the features of the development of the Orenburg fuel and energy complex.
3. The problems of theory and practice of clustering of the fuel and energy complex of the region are considered, the definition of an industrial cluster, the options for its adaptation to the conditions of functioning based on the regional fuel and energy complex are given.
4. A model of economic restructuring based on clustering of the fuel and energy complex of the region is proposed, a structural-logical and block diagram of creating a gas chemical cluster based on enterprises of the gas industry of the Orenburg region.
5. Theoretical and practical materials outlined in the article can be used in the development of schemes and programs for the development of industrial complexes, plans for the socioeconomic development of individual regions, and also in the educational process of economic specialties in higher educational institutions.

References

[1] Bergman, E.M., and E.J. Feser (1999). "*Industrial and regional clusters: concepts and comparative applications*": Regional Research Institute, WVU, http://works.bepress.com/edwardfeser/2/

[2] Chistik, O.F., Nosov V.V., Tsypin A.P., Ivanov O.B., and T.V. Permjakova (2016). "Research indicators of railway transport activity in time series" *International Journal of Economic Perspectives* 10 (3), 57-65.
[3] Enright, M.J. (1996). "Regional clusters and economic development: a research agenda" in *Business Networks: Prospects for Regional Development* by U.H. Staber, N.V. Schaefer, B. Sharma, Eds.: de Gruyter, Berlin and New York, 190-214.
[4] Lindqvist, G., Ketels, C., and Ö. Sölvell (2003). "*The cluster initiative greenbook*": Bromma Tryek, Stockholm.
[5] Kuznetsova, N.V. (2015). "Challenges of Russian fuel and energy complex" *Mediterranean Journal of Social Sciences* 6 (5), 112-121.
[6] Nekrasov, A.S., and Yu.V. Sinyak (2007). "Russia's fuel and energy complex: Development prospects for the period to 2030" *Studies on Russian Economic Development* 18 (4), 355-377.
[7] Porter, M.E. (1990). "*The competitive advantage of nations*": Free Press, New York.
[8] Borisyuk, N.K. (2009). "*Oil and the economy*": Economics Publishing House, Moscow.
[9] Borisyuk, N.K., and E.I. Kutsenko (2017). "*Fuel and energy complex and economic restructuring: monograph*": "Pressa" Agency, Orenburg.
[10] Borisyuk, N.K., and B.A. Davidov (1997). "*Reforming economic relations in the transition to the market*": Economics Publishing house, Moscow.
[11] Borisyuk, N.K., and Zh.A. Ermakova (2015). "From economic councils to clusters. Part 3. The emergence of a new economic system in Russia" *Bulletin of the Samara State University*, 8 (130), 42-48.
[12] Bistrov, O.F. (2016). "*Management of investment activity in the regions of the Russian Federation: monograph*": Infra-M, Moscow.
[13] Veber, A. (1926). "*Theory of the location of industry*": Book, Moscow.
[14] Ermakova, J.A. (2006). "Fuel and energy complex of the Orenburg region: prospects for innovative development" *Bulletin of Orenburg State University* 6-2 (56), 79-84.
[15] Ermakova, Zh.A. (2013). "Geochemical cluster of the Orenburg region: perspectives and problems of organization and functioning" *Bulletin of the Orenburg State University* 8 (157), 96-101.
[16] Zakharchenko, M.V. (2015). "Formation and development of the Orenburg oil and gas complex" *Transportation and Storage of Petroleum Products and Hydrocarbons* 4, 47-50.
[17] Korchagina, N.A. (2014). "Features of the management system of the regional fuel and energy complex" *Fundamental and applied research in the modern world* 2 (8), 94-96.
[18] Marshall, A. (1993). "*Principles of economic science*": Progress, Moscow.
[19] Minzov, A.S. (2016). "Modern threats to the fuel and energy complex in Russia" *Innovative, information and communication technologies* 1, 482-485.
[20] Ministry of Economic Development of the Russian Federation (2016, October 25). "*Source the 25th of October*", http://government.ru/media/files.
[21] Pogrebnyak, R.G. (2010). "Structural shifts in the fuel and energy complex of Russia in modern conditions" *Vestnik MPEI* 2 (1), 186-192.
[22] Soboleva, O.N. (2014). "Methodology of management of the fuel and energy complex of the region" *Economics and Entrepreneurship* 11-4 (52-4), 305-307.
[23] Titov, B.Yu. (2015, April 06). "*Business ombudsman authorized by the president of the Russian Federation for the Protection of the Rights of Entrepreneurs*", http://ombudsmanbiz.ru/2015/04/industrialnyj-nep.
[24] Tyunen, I. (1926). "*Isolated state*": Economic life, Moscow.
[25] Tsipin, A.P., and V.A. Ovsyannikov (2016). "Comparison of rates of growth (decrease) in industrial production of Russia and the USA in 1970-2010" *Intelligence. Innovations. Investments* 1 (2), 41-45.

Marketing Strategies the Agrifood Products

Filippo SGROI[1*], Enrica DONIA[2], Angelo Marcello MINEO[3]

[1]Associate Professor of Agricultural Economics; Department of Agricultural, Food and Forestry Sciences, University of Palermo, Palermo 90128, Italy; E-mail: filippo.sgroi@unipa.it
[2]Researcher of Agricultural Economics; Department of Economics, Business and Statistics, University of Palermo, Palermo 90128, Italy; E-mail: enrica.donia@unipa.it
[3]Full Professor of Statistics; Department of Economics, Business and Statistics, University of Palermo, Palermo 90128; Italy; Email: angelo.mineo@unipa.it
*Corresponding author: Filippo Sgroi; Tel.: +39 091 23896615; fax: +39 091 484035; E-mail: filippo.sgroi@unipa.it

Abstract

Agri-food production represents the specific character of an area. Food and wine culture derives from this production and is a distinctive element and an important asset for the area, with important repercussions in other sectors of the economy: industry, commerce, tourism, research. Agri-food heritage is constantly evolving, and there are frequent cases of imitation products sold in non-European markets. To combat this phenomenon, the European Union has sought to reduce this risk by granting quality marks to products that demonstrate specific links to their places of origin. The objective of this work is to analyze the motivations, benefits, and costs associated with the recognition of a local product by a Slow Food Presidium, considering both individual companies and local production systems. The research shows that Slow Food Presidia initiate processes of regeneration for the "value" of food products and play a critical role in the success of individual companies, in particular, but also for the local area more generally.

Keywords: *development; environmental; agri-food.*

1. Introduction

Today, the Italian agri-food industry, in particular for traditional quality products, plays a fundamental role in the national production landscape, both in terms of the overall turnover and value of exports as well as the ability to positively contribute to the image of Italy in the rest of the world.

In a global economy, it is absolutely necessary to make the incredible uniqueness of local food products visible outside of their areas of production, along with the reasons for their exceptional qualities and attractiveness, which include the product itself, the production philosophy, consumption behavior, and the tourist and recreational experiences that the area can offer.

Furthermore, the protection and promotion of traditional quality products, taking into account the specific vocations and problems of individual areas, are a useful tool for the protection of local plant varieties and habitats threatened by the underutilization or abandonment of agricultural lands, with all the negative consequences that can occur at the level of both the micro- and macro-environment.

The evolution of consumption styles in the food sector has created apparently contradictory tendencies: on the one hand, it is driven by the spread of large-scale retail channels with a strong emphasis on a fairly standardized and habitual type of consumption; on the other hand, there has been the success of phenomena such as Slow Food, which aim at identifying and enhancing everything that can bring to mind the values of the local area and of the lost genuineness, craftsmanship, and traditions of the territory.

In this work, we have analyzed the case of Villalba lentils, which are produced in an inland area of Sicily, in order to understand the value of Slow Food as a tool for the protection of traditional quality agri-food products.

At a moment when the traditional local production of Italian food and wine is being re-evaluated, and in the context of approaches to this issue that oscillate between a vision centered exclusively on the product and one that tends to focus on connotations of cultural and territorial value, it seems useful to approach the phenomenon of Slow Food "protections" with a view that highlights the typically business-oriented aspects of this initiative which has such strong cultural and territorial significance.

This analysis is also aimed at verifying whether the goal of safeguarding products, which are strongly connected to production models and processes, rooted in the culture of a local community, and in danger of extinction, can be transformed into an initiative capable of nurturing the process itself and increasing its impact on the territory. The case of Villalba lentils has been analyzed in order to fully understand the value of this instrument for the protection of traditional quality agri-food products. The importance of this question is not marginal, if we consider the recent history of proliferating interventions intended to safeguard traditions and, more generally, the identity components of a local community.

2. The Economics Literature

The promotion of traditional local products is the decisive element for the endogenous development of an area in light of the important effects it can produce on the economy, society, and tourism. The success of a product on the market fosters the stability of the company in the area, the creation of jobs, and the activation of virtuous production processes. Indeed, through the valorization of traditional qualities, the purely productive function of agricultural activities is complemented by new and different

functions, including the protection of the environment and the local area as well as the conservation of rural culture and traditions (Belletti and Berti, 2011).

Traditional products are the result of small-scale agricultural activities which have specific characteristics due to the combination of local raw materials and traditional production techniques handed down over time. Businesses, especially those of smaller size and/or located in sometimes disadvantaged and marginal areas, see traditional products as a chance to find a new area in which they can compete in the face of increasingly competitive markets (Marescotti, 2001).

It is well-known that traditional products, as a form of expression of the local culture of an area, greatly influence the social and economic development of rural areas (Brunori and Rossi, 2000; Treager, 2003), in particular through the realization of socio-economic benefits, such as: increasing the incomes of agricultural enterprises, in both individual and associated forms; the emergence of skilled employment; greater social vivacity; the regeneration of traditional activities through their promotion and conservation; the development of food and wine tourism that can contribute to improving the economic sustainability of the reference areas.

These ideas are consistent with the principles of endogenous rural development theory (Ploeg van der, 1993, Ploeg van der 2006), a paradigm that is primarily focused on less-favored rural areas that have been excluded from modernization processes. The resulting model of development is inwardly-focused and, at the same time, conservative because it seeks to preserve the local elements on which it is based (Sortino et al., 2008); it is characterized by the use and reproduction of locally developed experiences and knowledge to convert local resources into quality agri-food products. It is a locally driven development that respects and protects local values. Within this paradigm, traditional products become a resource capable of giving value to the development of smaller areas because they can integrate and enhance the different territorial resources (Brunori and Rossi, 2000, Marsden et al., 2000), adapting to the different needs arising from the changes in consumption style of postmodern tourists.

Traditional products are normally perceived by consumers as more natural and respectful of the ecosystem because they are associated with more artisanal activities and less environmental impact than industrial food products. In addition, they are seen as utilizing raw materials and production techniques which are more respectful of natural balances in terms of using additives, preservatives, dyes, and so on. The collective nature of the traditional product and its ability to enhance the identity, quality, and culture of a local area can lead to the establishment of new networks of social relations that guide the choices of local development towards issues concerning sustainable development, the quality of community life, and the enhancement of territorial identities.

The intimate bond between traditional local products and their local areas must be taken into full consideration when creating strategies for the promotion and valorization of traditional local products, understanding that these products can be important communication tools and a brand image for a territory. On the other hand, the presence of a delimited and identifiable space is fundamental for the creation of a process that can promote a particular traditional product since it defines an identity for its producers that valorizes its unique characteristics (Bruwer, 2003).

The traditional agri-food product can be defined as "a product that has some unique quality attributes that are an expression of the specificity of the particular territorial context in which its production process takes place" (Belletti et al., 2006).

The relevant factors in determining the typicality of traditional agri-food products can be oriented around three axes: the specificity of the local resources used in the production process; the production history and tradition; the collective dimension and the presence of shared knowledge at the local level (Bérard and Marchenay, 1995). Specific local resources, deriving from the pedoclimatic environment and genetic resources, and more generally from the set of elements typical of the "physical" environment in which the product is produced, determine the distinctive features of the quality attributes of traditional products. However, it is certainly reductive to consider the uniqueness of traditional agri-food products as linked only to natural resources since it is always human action that allows those resources to express their potential. This is particularly evident for processed products (such as cheeses and cured meats).

The aspect of historical tradition takes center stage, with Italy and France in the lead. It is, indeed, through an evolutionary process that, over time, the techniques and knowledge of the local actors are formed, perfected, and adapted to the socio-economic, environmental, and cultural context of the place.

The link between traditional products and their local areas also involves aspects of local culture and identity. Very often, the traditional product is part of the "historical memory" of the local population, not only on the production front, but also on the side of its use in preparing local dishes and social consumption practices, thus functioning as an element of local identity.

The third set of factors related to typicality is the collective dimension, which is closely connected to history and traditions. The traditional product, in contrast to other products of specified quality (for example, an organic agricultural product), is closely linked to a community of actors rather than a single individual or business, by virtue of its connection to a given area that is established, refined, consolidated, and modified over time. This process of accumulation and sedimentation of knowledge (contextual and often uncodified) makes it possible to talk about the traditional product in terms of heritage (Bérard and Marchenay, 2006): the product, along with the ways of producing, storing, distributing, consuming, and appreciating it, become part of the local community's heritage.

A more complete definition that takes these aspects into account is therefore the following: "A typical agri-food product is the result of a collective and localized historical process of accumulating contextual knowledge that is based on a combination of specific local resources both of a physical and anthropic nature, giving rise to a strong, unique and non-reproducible link to the area of origin" (Belletti et al., 2006).

In the current terminology, the term "valorization" of a product indicates any activity aimed at increasing the price that the product can obtain on the market, that is, an improvement in the overall position of a product on the market so as to achieve an increase in the net income obtained by the producer as a result of the increase in product sales prices and/or company sales volume. The valorization of a product is a set of activities, both strategic and operational, aimed at improving value creation for the product by acting on two different fronts: that of the attribution of value by consumers and society, and that of the effectiveness of production processes on the part of the businesses involved. These activities are carried out both by economic agents (companies) and non-economic agents (such as public administrations and associations) that have a vested interest in the fact that the resources used for production are adequately remunerated and can thus be sustained.

Valorization must be conceived as a process created by a variety of actions and activities which are the product of a strategy on the part of the actors interested in the traditional product, aimed at connecting the production system and other related local resources to consumer needs and, in general, the company's expectations.

The value of the traditional product does not immediately correspond to the price that it finds on the market at a given moment. Indeed, the market price of the product derives mainly from the value of direct use that the immediate consumer attributes to it; however, this does not express other valuable aspects that cannot be used by the current consumer or cannot be fully used.

The traditional product can generate an indirect use value, which is always expressed by the price paid by the direct consumer, but it does not refer to the product as such but to other economic activities connected to it. The traditional product can also generate a hereditary value, which is not easy to quantify in monetary terms, even though adequate communication to the producer can allow an increase in the price. The traditional product also generates an existential value linked to specific resources, such as plant varieties or animal breeds at risk of genetic erosion, or local culture and traditions.

The total value of the traditional product goes far beyond the value that can be incorporated into the product itself and which can be remunerated by the price that a consumer pays for the product. From this fact, it is necessary to point out two important consequences for possible support actions by the public operator:

- The public operator, often a local administration, can be justified in carrying out actions to support the valorization processes of traditional products on the final market which are aimed at making it possible to incorporate the various value-added components into the price of the product.
- Sometimes the valorization of a traditional product on the market is not sufficient to compensate the producers for the production costs they bear; in such situations, the public operator can evaluate the opportunity to intervene to support the production system through non-market mechanisms such as monetary incentives or investment aid.

In order to provide greater guarantees to the consumer regarding the identity of the product, various remedies have been used, such as the introduction of brands or particular labeling procedures. For the consumer, the brand or indications on the label guarantee that a food is no longer anonymous but possesses an identity. In the agri-food sector, the quality of products has been protected for a number of years by a robust regulatory framework of national and international rules which safeguard the unique aspects of food products and guarantee that their characteristics remain constant over time through a thorough and regular monitoring process (ISO 9000 and ISO 14000 standards; EMAS).

An agri-food brand is not an individual brand, but rather a collective brand that identifies products from various entrepreneurs with particular characteristics and qualities. Its function is to express a precise message indicating the origin, nature, and quality of the products, informing the consumer of the products' characteristics and exerting a selective function because it encourages producers to make an effort to improve production that will be immediately repaid by the product's increased attractiveness to consumers.

Slow Food Presidia support small producers of high-quality products that risk disappearing, promote local areas, recover traditional crafts and processing techniques, save native breeds and ancient varieties of vegetables and fruit from extinction. They directly involve producers, offer assistance to improve product quality, facilitate exchanges between different countries, and seek new market outlets. The characteristics of every Slow Food Presidium are:

- a real or potential risk of extinction;
- a link to the memory and identity of a group: Slow Food Presidia products must be native varieties or ecotypes which have been traditionally cultivated in the production area, having characteristics that are connected to a specific cultivation area and developed thanks to a strong connection with the pedoclimatic qualities of a particular area;
- a proven link to a local area: the products must be connected to a specific area from an environmental, historical, and socio-economic point of view;
- limited production quantities from small farms or processing companies;
- high organoleptic quality and environmental and social value.

Slow Food is an international non-profit association with 100,000 members in 150 countries around the world. Founded by Carlo Petrini in 1986 with the objective of promoting good, clean, and fair food, it went international in 1989.

To safeguard, spread, and promote biodiversity, Slow Food has developed several tools. One of these are food communities, groups of people who produce, transform, and distribute quality food in a sustainable way and which are linked to a local area from a historical, social, and cultural point of view. Their activity involves different sectors: fishing, breeding, beekeeping, organization of farmers' markets. In defining a food community, what matters most is sustainability (environmental and social). All food communities are part of a large international network called Terra Madre. Another tool is the Ark of Taste, an online catalog of traditional and artisanal quality food products from around the world that are at risk of extinction.

Slow Food Presidia are projects that involve food communities and safeguard native breeds, plant varieties, and processed products (bread, cheese, cured meats, wines). Their goal is to save traditional, artisanal and quality products, strengthening the organization of producers, enhancing areas of origin, preserving traditional techniques and knowledge, and promoting sustainable production models from an environmental and social point of view.

Earth Markets are farmers' markets, meeting places where local producers sell local quality products directly to consumers.

In Italy and Switzerland, Slow Food Presidia are identified by the "Slow Food Presidium" label which appears on product packaging in order to better identify them on the market. The identification of a product takes place by considering different parameters, including environmental characteristics, local area knowledge, local reputation of the product, processing techniques, recipes, conservation and marketing methods, environmental sustainability.

The selection criteria that have been adopted are: taste, history, culture and link to the local area, small-scale production, risk of extinction, social and environmental sustainability.

The foundation of slow philosophy is the pleasure of taste. The products must be of particularly high quality. Gastronomic quality, defined by local customs and traditions, is identified through three elements: balance, local character, and complexity. By equilibrium, we mean a good harmony between the specific aromatic and gustatory components of the product. By local character, we mean the ability of the product to express organoleptic characteristics linked to its territory of origin. By complexity, we mean its positive organoleptic evolution over the duration of the tasting.

In order for a product to be included among the Slow Food Presidia, it must be linked to the memory and identity of a group.

The products must be produced in limited quantities by small farms or processing plants, and they need to have a precise identity: they must be distinguishable and not standardized. They must be at risk of extinction, real or potential, not only in terms the product itself (the plant variety, the breed, the transformed good), but also the landscape, social context, or production technique.

Cultivation techniques must preserve the fertility of the earth as well as hydrographic ecosystems, and they should exclude the use of synthetic chemicals as much as possible.

The Presidium always involves a community, and producers must be willing to cooperate. One of the objectives of the Presidia is to obtain an adequate and profitable price for producers, to improve their quality of life and the socio-economic well-being of their families. The price must also be transparent and fair to consumers.

To define the production area, it is necessary to combine

different elements, including the identification of a more or less homogeneous territory, and gathering the opinion of the community through interviews with the elderly and local historians to find out where the product was produced and where it was traditionally consumed.

The Presidium helps producers to come together to form an association (or cooperative, consortium, etc.) with a common name and brand. The association facilitates the relationship with public institutions and obtaining public funding. The association of producers is responsible for the correct use of the brand.

For production chain monitoring, Slow Food has decided to focus on so-called "participatory certification," which brings together several elements: self-monitoring by individual producers, the collective management of brand use by the producers' association, consumer monitoring.

Every year, the producers declare how much they have produced, how many animals have been reared, how much land they cultivate. The producers' association collects this information in a register. Slow Food reserves the right to carry out sample checks where and when it deems it necessary regarding the correct use of the brand, the quality of the products, and compliance with the rules.

In order to evaluate the progress of Slow Food Presidia projects, it is necessary to evaluate some qualitative parameters. Everything starts from the definition of sustainability, articulated in the three areas of sustainable development:

- social sustainability: the ability to guarantee access to basic necessities (safety, health, education) and conditions of well-being (fun, serenity, sociability) in a fair way within communities;
- environmental sustainability: the ability to maintain the quality and reproducibility of natural resources over time; the ability to preserve biodiversity and guarantee the integrity of ecosystems;
- economic sustainability: the capacity to generate long-term income and employment and to achieve eco-efficiency, understood as a rational use of available resources and a reduction of the exploitation of non-renewable resources.

The monitoring scheme for Slow Food Presidia projects aims at recording their individual aspects (social, environmental, economic) but also highlighting the integration of the different dimensions considered, with reference to:

- the efficiency of production and consumption, intended as a reduction of environmental costs and a valorization of related economic opportunities and benefits (integration of the economic and environmental dimensions) over the medium-term, and the possibility of access to resources and environmental quality (integration of social and environmental dimensions) for all members of the community;
- the quality of life of individuals and communities, understood as the interweaving of environmental quality and the quality of built spaces, economic conditions, welfare and social cohesion (integration of social, economic, and environmental dimensions);
- local competitiveness, understood as an innovative capacity that invests in natural and social capital and enhances and strengthens local resources (integration of social, economic, and environmental dimensions).

3. Materials and Methods

Through the request for brand recognition, the promoters (companies as well as local institutions) pursue the objective of developing the rural area through mechanisms such as the diversification of activities or the maintenance of traditional cultivation and processing systems.

In the course of this investigation, the main issues to be investigated were condensed into three questions:

1. the relevance of the tool: is the Slow Food brand a tool that can be used by companies that are actually part of the production system and oriented towards specific markets?
2. the efficiency of the instrument: does the Slow Food brand incur costs that are sustainable compared to the expected benefits?
3. the effectiveness of the instrument: are the benefits which are actually achievable in line with the benefits that companies expect to achieve?

To answer these questions, we analyzed the Sicilian Slow Food Presidium for Villalba lentils. The cultivation of this legume dates back to the beginning of the nineteenth century, but its period of maximum production occurred between the 1930s and 1960s. Subsequently, the high cost of labor and limited yields forced many growers to abandon cultivation. The market is oriented towards the consumption of small seed lentils, favored for their shorter cooking time. Another aspect that led to a reduction in cultivation was the increase in imports of foreign legumes at lower prices.

The recovery of this product did not begin until the 1990s, when the Bari branch of the National Research Council brought out its remarkable characteristics: it emerged that Villalba lentils possess a high quantity of iron and protein, combined with low levels of phosphorus and potassium.

Cultivation, with autumn sowing, occurs on superficially plowed soil, and the seeds are sown in rows about 80 cm apart. The harvest is carried out in mid-June, strictly by hand. Once dried, it is available for use year-round. Production takes place in the district of Villalba (province of Caltanissetta) and in some neighboring areas, including Marianopoli, Vallelunga, Mussomeli and Cammarata.

Slow Food reported this product in the Ark of Taste as early as 2007, and its Presidium was activated in 2012 with 17 local producers joined together in the Pro.le.vi (Villalba Lentil Producers [Produttori lenticchie di Villalba] Association) and the voluntary Consortium for safeguarding the Villalba lentil.

The analysis of this Presidium is based on approximately 30 questions. A questionnaire, based on the principles of Slow Food, was developed and submitted to the various producers participating in the project. The analysis was carried out in order to evaluate the three fundamental dimensions identified by Slow Food: social, environmental, and economic sustainability. Along the first strand of reflection, the role of the Presidium can be identified through its capacity for bringing people together and activating relational networks within the Presidium itself.

In this context, we gathered information regarding:

- the establishment of the Presidium;
- relationships between producers and the social context;
- the role played by the Presidium in activating formalized relations among its participating companies (the creation of consortia, associations, cooperatives), so that the Presidium is not just a group of companies, but becomes a network of companies.

Along the second line of inquiry, we tried to highlight the relationship between the production of Villalba lentils and the local area in which they are cultivated:

- the impact of cultivation on the environment;
- production, processing, and packaging methods.

The third strand of inquiry focused more on the identification of the economic issues deriving from the activation of the Presidium:

- production;
- marketing.

In every phase of the survey, we made use of the input of producers.

The central element of the entire survey remains the indi-

vidual company, with its strategic choices as well as its problems, both relating to the organization of production and the need to create a market for its products. These are problems that acquire a unique scope and have peculiar implications in the case of Presidia, where sometimes producers undergo a transition from free-time activity to entrepreneurial initiative, and there is always a context of small-scale employment in line with the model of a family business.

This research was an exploratory social investigation, and the questionnaire was submitted directly to the entrepreneurs.

4. Results and Discussion

The companies to be interviewed were selected from the lists of producers provided by the Pro.le.vi. Association and the Consortium for the protection and promotion of Villalba lentils.

Villalba lentils are a very small element in the broader field of traditional products. Production is around 20,000 kg per year, and the area currently used for its cultivation is about 25 hectares. There are about thirty producers operating in the sector, but only 17 of those participate in the Presidium project. The supply of this product is limited compared to the market demand, even though this is not reflected in the market price, which is around 7-8 euros/kg.

During the survey, 10 companies producing Villalba lentils were interviewed, all of which belonged to the producers' association created by the Slow Food Presidium and the protection consortium. Among these companies, eight are only engaged in cultivation, and two perform all stages of the production process (from sowing the seeds to packaging the product and selling it); of the latter, one uses the product as part of the restaurant and agritourism activities that it operates.

The companies are all small, each with about 1-2 ha of dedicated cultivation, and few companies cultivate more than 4 ha of land. The work in these production units is carried out mainly by the owner, independently or with the help of family members; the production of this type of lentil, in most cases, is a secondary activity. The majority of the companies interviewed annually produce a total quantity of about 1,000-1,500 kg, while only one produces more than 3,000 kg (Table 1).

Lentil production classes	no. farms
>3,000 kg	1
1,000-2,000 kg	5
<1,000 kg	4
Total	10

Table 1. Classification of interviewed companies by total lentil production volume
Source: direct survey

The activity of these companies is mainly focused on the cultivation of lentils (Table 2), but in many cases, this production is also associated with the cultivation of other products, such as oregano, chickpeas, tomatoes, and wheat, and the harvesting of almonds and olives. Only one company exclusively produces organic products.

% total revenue derived from lentil production	no. farms
Less than 15%	0
From 15% to 50%	0
From 50% to 60%	7
More than 60%	3

Table 2. Classification of interviewed companies by percentage of total company revenue derived from lentil production
Source: direct survey

Marketing takes place mainly through direct sales (Table 3). In most cases, buyers are loyal customers who buy lentils both for their own consumption and to offer as gifts. A large part of the production is for their own consumption or is offered to friends and relatives.

Channel type	no. farms
Direct sale to consumer	10
Traditional retail	7
Wholesale	0
Large-scale retail	2
Restaurant/Catering	2
E-commerce	0

Table 3. Relevant geographic market for the interviewed companies: distribution of companies across various channels
Note: The Table shows the number of companies present in each channel. The same company can be present in different channels.
Source: direct survey

In terms of the types of markets concerned, those that best value the product are certainly the local markets, where these lentils are better known and appreciated (Table 4).

Geographic market	no. farms
Local market (same province)	10
Regional market (other provinces)	6
Other Italian regions	4
Foreign markets	0

Table 4.
Relevant geographic market for the interviewed companies: distribution of companies across various market types
Note: The Table shows the number of companies present in each market type. The same company can be present in different market types.
Source: direct survey

The Villalba lentil is a biotype selected in this historic area of cultivation since ancient times. The cultivation has been put in crisis in recent decades by the spread of false Villalba lentils coming from Canada. The period of highest production in Villalba was between the 1930s and 1960s, when about 30% of Italian production came from Sicily, specifically from this town in the province of Caltanissetta.

The Presidium includes 17 farms which are active in the recovery of the seeds. At the time of the Presidium's creation, producers did not participate in events or exhibitions outside their local area, and many of them had never traveled outside of their region to promote their product. Slow Food has organized events and exhibitions in Italy, the most important of which was the Salone del Gusto in Turin.

Before the creation of the Presidium, there were no organizations for uniting producers, and Slow Food encouraged producers to form one. Today, some producers belong to the Pro.le.vi Association, and others have joined the Consortium for the protection and promotion of Villalba lentils.

Slow Food has carried out promotional activities (articles, television coverage, exhibitions, and the like) aimed at increasing the profitability of this lentil and at attracting young people to participate in its production. Today, several young producers directly manage their own companies. In addition, both the Pro.le.vi association and the Consortium are chaired by young farmers.

The desire to give life to a Presidium has stimulated the

producers to be more engaged with public institutions and to carry out their activities collectively. The Presidium has encouraged relations with other local institutions, such as the Municipality of Villalba.

Before the creation of the Presidium, the producers had not received any awards for actions to safeguard this lentil. They were not aware of the potential of a quality product like that of Villalba lentils. Now, some producers of the Presidium are becoming known in artisanal production circles, and one producer is the owner of an agritourism business.

The Presidium's activities have spurred producers to improve crops through consultation with each other as well as with Slow Food technicians. Indeed, producers have had the opportunity to make this lentil's tradition and history known through conferences and events organized precisely for this purpose.

Before the Presidium, there were approximately 30 producers dedicated mainly to cultivation for their own consumption. These producers did not have the opportunity to participate or organize educational activities, but today some of them are working to promote the creation of teaching farms. Until the creation of the Presidium, there were no conscious actions aimed at protecting the ecosystem; agricultural activity was usually carried out according to methods handed down in the family. Slow Food has encouraged the development of greater knowledge and awareness of working for the protection of biodiversity and the environment, maintaining the traditional cultivation of lentils by stimulating interest in preserving other local products, such as Siccagno tomatoes and durum wheat. Over time, these kinds of activities provide the possibility of recovering marginal and abandoned land.

The cultivation of the Villalba lentil has never required irrigation, and the production specifications have provided for the maintenance of traditional practices. Before the project started, some producers were fertilizing their crops with chemicals. The action of Slow Food technicians has pushed producers to be more sensitive to environmental issues, and the Presidium has decided not to practice chemical fertilization but to only employ organic fertilizers. In addition, to contain parasitic attacks in the fields, producers may only use products permitted by organic farming regulations. For weed control, the use of any type of synthetic chemical herbicide is not allowed. The material used for the production of Villalba lentils is obtained from seeds that are produced within the production area.

Before the establishment of the Presidium, there were no production specifications. Numerous meetings were held and policies were drafted and agreed to by the producers. The association has recognized these policies as guidelines, and its members regularly apply them. Before the Presidium, not all producers sold packaged products; many of them sold the lentils in bulk or consumed them within their families. Slow Food has stimulated producers to sell the packaged product. At the moment, packaging is not uniform, and every manufacturer has its own packaging.

Before the Presidium began, producers sold lentils directly to consumers. Now, some producers in the Presidium sell part of their lentils wholesale as well as retail, and they have cultivated loyal customers who order the product in advance to have it delivered to their homes, or who buy it directly at their companies and at public sales events. The percentage of product sold to retailers is very low. Some manufacturers sell 100% of their product directly to the final consumers, and some larger companies have around 60% direct sales.

Before the Presidium, the market was local. Most of these lentils, 60-70%, are sold in the Caltanissetta area and in the rest of the region. The remainder goes to customers from all over Italy.

The sales price before the Presidium ranged from 3-4 euros/kg for those who sold lentils directly from the company. Slow Food, thanks to its public information campaigns, has highlighted the importance for consumers of choosing this lentil. The market price is now around 7-8 euros/kg when the product is sold directly. The price is profitable, even though the production costs of this lentil are, on average, higher than those of common lentils, due to the type of processing that is done and the type of terrain on which it is grown.

Villalba lentil production before the Presidium was around 10,000 kg per year. Today, the Presidium's lentil production stands at 20,000 kg per year.

The goals of the producers' association in the next few years are the recovery of uncultivated but suitable land and the improvement of some producers' cultivation techniques.

The motivations that have encouraged producers to join the Slow Food Presidia project for Villalba lentils come from two broad areas: the first concerns the possibility of promoting their products and the local area; the second refers to protection against unfair competition in the use of the product name, a fairly frequent phenomenon linked to the growing fame and reputation acquired by the product in recent years.

The decision to use the Slow Food brand did not involve any costs for investments in structures and/or equipment dedicated to the product. The only expenses were the purchase of refrigerators for cold treatment against weevils.

The organization of work has remained virtually unaltered, with the only change involving the sorting of the product to be packaged for sale, which requires the elimination of the smaller, discolored or malformed lentils. In addition, the producers pay a fixed annual fee of 25 euro to the Slow Food Foundation.

In light of both the direct and indirect costs of certification, there is an average price difference of about 1.5 euro per kg (varying from a minimum of one to a maximum of 3 euro per kg) between the Slow Food-branded product and ordinary lentils. Although not all companies were able to respond to this question, most believe that this difference is sufficiently profitable to offset the increase in costs.

Regarding the producers interviewed, the total production of Villalba lentils is approximately 25,000 kg, but only 60% are certified. In fact, part of the harvest (around 5%) is used for planting the next year's crop; another part of the uncertified production does not conform to the production specifications, as the lentils are either too small, discolored, or malformed. Other reasons related to the incomplete use of the brand are linked to customer preferences: some, especially large processing companies, require bulk lentils (this possibility is not provided for by the Presidium specifications), while others buy them for personal use or as gifts for friends and relatives.

It is clear that the product follows diversified sales channels, even though the primary market remains the local one. About half of the production is destined for the direct sales channel. Of particular importance are the traditional retail channels: shops in Palermo that buy the product mainly for display in their business, and processing companies.

Producers who perform only the cultivation phase pass the product on to other local companies that deal with packaging and sales. Only two companies reported that they sell to modern distribution channels to ensure a certain regularity in commercial relations.

Among the different channels available, the producers interviewed argue that the one that can best promote Villalba lentils is direct sales, since it allows an exhibition of the product that directly communicates its qualities and characteristics, as well as being a type of channel where it is possible to offer customers suggestions on the cooking methods that best enhance the product's distinctive characteristics. Direct sales is a privileged channel to better understand the peculiarities of the product, its traditional cultivation methods, and the characteristics of the production area. On the other hand, mediated sales facilitates customer diversification and the widening of the market area; in fact, almost all products that use this channel reach a national scale.

In terms of the location of the sales markets, certainly those that best value the product are local markets where it is better known and appreciated. In recent times, considerable con-

sensus has also been found on the regional market, resulting in a better knowledge of the production area.

Overall, the degree of satisfaction resulting from the use of the Slow Food brand is good. In particular, product differentiation, the quality guaranteed to the consumer, and the increase in volumes on the same channels were objectives achieved or exceeded by more than 80% of the companies interviewed; a lower level of achievement of the objectives was shown in relation to accessing large-scale retail channels, and also with respect to the objective of protection from unfair competition.

Therefore, joining the Presidium project offered good opportunities to local producers, both in terms of product price and the activation of new sales channels.

The incomplete use of the Slow Food brand with respect to total production derives from a lack of knowledge on the part of some producers about the potential benefits offered by adhesion to the project and from reducing the yield given the limits imposed by the production specifications.

5. Conclusions

By analyzing the case study of the Villalba lentil, we aimed to identify the reasons that underlie the use of the brand, the problems encountered by the companies, and the degree of satisfaction achieved in relation to the numerous and varied expectations expressed at the time the request for product protection was made.

The results of the direct survey show different situations – depending on the type of production system, commercial channels used, business strategies, size and degree of specialization of the companies, and the level of business professionalism – to the point of making it extremely problematic to reach an unambiguous conclusion regarding the effects, efficacy, and efficiency of the Slow Food brand.

The companies characterized by the highest professionalism and size see the Slow Food brand as a way to differentiate their supply on the market, consolidate commercial channels and/or open new ones, using it as a symbol of reassurance for both final and intermediate customers. On the other hand, expectations of price increases for the products are more contained, given the enormous competition on the market.

The effective use of the brand on products appears to be quite variable among the different producers, depending on a series of factors that act on the delicate balance between costs and benefits. On the costs side, the perceived size of the costs of adapting to the requirements contained in the production specifications has a decisive impact on the decision, but the size of direct costs resulting from accession to the project appears of little importance.

On the other hand, the obtainable benefits depend on the type of commercial channel used and that can be activated, given the production volumes of the individual company, as well as the magnitude of the price increases for the branded product compared to non-branded products.

It is therefore possible to state that joining the Slow Food Presidium project assures the defense of the production system and seems to turn into an offensive weapon on the markets, especially for those companies and systems that use longer and more modern commercial channels and which aim to serve increasingly vast and diversified markets.

Unfortunately, however, it is clear that not all local production companies will be able to evolve from purely domestic companies to companies that target the global market. Therefore, traditional products seem to be suitable for the global market only if they have certain characteristics, such as geographical specificity, uniqueness and inimitability, individuality by name and by brand, large-scale awareness, sufficient production, specialized niches which are interested in the products and willing to pay a fair price for the product.

The current challenge is, therefore, the ability to effectively communicate in order to spread the notoriety of traditional products and, at the same time, the ability to manage an organization capable of operating in such concrete diversification. The aspects linked to managerial deficits mentioned above with reference to small producers could, in this case, be an obstacle to the qualitative leap that appears necessary for these kinds of products.

The presence of locally-concentrated demand and a substantial fragmentation of production create a management complexity that often clashes with a sector characterized by the dominance of small and medium-sized companies with a poor marketing culture and, often, antiquated managerial models. These conditions hinder the adoption of a market orientation, thus slowing the development of entrepreneurship and the diffusion of organizational models aimed at growth on both national and international markets.

In particular, for companies that aim to develop an international sales dimension, the weaknesses appear to be those related to small-scale technical/operational issues that limit the potential for expansion.

The information that has emerged from this research suggests certain reflections that could be useful both for framing the “Presidium phenomenon” and, more generally, addressing the issue of safeguarding and valorizing products which are closely linked to local traditions and thus characterized by a context that is, at the same time, historical and niche, and generally at risk of disappearing due to insufficient economic profitability.

The opportunity of bringing these products to consumers beyond the local or regional area will only be possible if the fundamentals necessary for a properly entrepreneurial activity are put into place, in particular, the application of business logic and the transformation of amateur business activity into a more professional, market-focused orientation.

The research has also shown a clear differentiation of the strategy of each of the companies participating in the Presidium. This is evident from the analysis of the parameters related to the marketing of their products: the choice of marketing channels generally affects both the market areas and the types of end consumers. Within the same Presidium, it is possible to find companies that market their product exclusively through direct sales, and others which also use intermediaries to create further opportunities; there are companies for which participation in fairs and exhibitions is an important sales channel, and others that do not take these opportunities into consideration.

But beyond the strategic options of individual companies, it is important to always maintain, to a certain extent, opportunities for direct contact between producers and consumers in order to transmit the culture of the specific product, giving it an added value that can make it irreplaceable to consumers compared to other similar products.

Even if it refers directly to a cultural matrix, the Presidium is explicitly characterized in terms of economic activity as a direct consequence of the fact that it brings businesses together. The protection and valorization of particular products is only possible if a market condition is established for these products, which in turn requires the company to organize its productive activity.

One of the most obvious – and generalized – results obtained by the formation of the Presidium was increased production, in some cases quite substantial. This growth was often (though not always) accompanied by a sharp increase in sales prices, significantly increasing profitability. It is evident that such a correlation is possible only if the increase in supply is accompanied by a parallel – and larger – growth in demand and, to a non-marginal extent, by an equally significant increase in the prestige of the product itself.

But there is another economic implication, related to employment, that should not be underestimated: while it is true that every single company, taken in its own right, is characterized by micro-employment and, above all, a family dimension, it is also true that, after the establishment of the Presidium, no manu-

facturer has abandoned its activity, despite the fact that this sector is characterized by high marginality and business failures are anything but sporadic.

The establishment of the Presidium has provided the opportunity to safeguard production and work processes that are rooted in a strongly circumscribed tradition and, at the same time, make these aspects known as key elements of the product's identity as well as that of the local area.

Although it is a niche product with a very limited production area, the producers of Villalba lentils have succeeded, even though in some cases in a limited way, in expanding the target markets of their product, spreading knowledge about of the production territory by linking the name of the locality, which previously was virtually unknown, to that of the product.

References

[1] Belletti, G., & Berti, G. (2011). Turismo, ruralità e sostenibilità attraverso l'analisi delle configurazioni turistiche in Pacciani A.(a cura di). *Differenziazione e sentieri di sviluppo in Toscana*, FrancoAngeli, Milano.

[2] Marescotti, A. (2001). Prodotti tipici e sviluppo rurale alla luce della teoria economica delle convenzioni. In Basile E., Romano D. (a cura di). *Sviluppo rurale: società, territorio, impresa*, Franco Angeli, Milano, Forthcoming.

[3] Brunori, G., & Rossi, A. (2000). Synergy and coherence through collective action: some insights from wine routes in Tuscany. *Sociologia ruralis*, 40(4):409-423.

[4] Tregear, A. (2003). From Stilton to Vimto: Using Food History to Re-think Typical Products in Rural Development. *Sociologia Ruralis*, 43(2):91-117.

[5] Ploeg, J.D.V.D. (2006). Agricultural production in crisis. Handbook of rural studies, 258-277. Cloke, P.T., T. Marsden and P.H. Mooney, *Handbook of Rural Studies*, Sage, London.

[6] Ploeg, J. D. V. D. (1993). Rural Sociology and the New Agrarian Question. A Perspective from the Netherlands. *Sociologia Ruralis*, 33(2):240-260.

[7] Brunori, G., Rossi, A. (2000). Synergy and Coherence through Collective Action: Some Insights from Wine Routes in Tuscany. *Sociologia Ruralis* 40(4):409-423

[8] Marsden, T., Banks, J., & Bristow, G. (2000). Food supply chain approaches: exploring their role in rural development. *Sociologia ruralis*, 40(4):424-438.

[9] Bruwer, J.(2003). South African wine routes: some perspectives on the wine tourism industry's structural dimensions and wine tourism product. *Tourism management* (24):423-435.

[10] Belletti, G., Brunori, G., Marescotti, A., Pacciani, A., Rossi, A. (2006). In Rocchi, B., Romano, D. (a cura di). *Il processo di valorizzazione delle produzioni agroalimentari tipiche. Tipicamente buono. Concezioni di qualità lungo la filiera dei prodotti agro-alimentari in Toscana*, Franco Angeli, Milano, pp.175-198.

[11] Bérard, L., & Marchenay, P. (1995). Lieux, temps et preuves. La construction sociale des produits de terroir. *Association Terrain*, 24:153-164).

[12] Bérard L., Marchenay P. (2006). Local products and geographical indications: taking account of local knowledge and biodiversity. *International Social Science Journal*, 187:109-116.

How Quality Attributes Contribute to Market Price?

Gerarda CASO[1], Roberto FREDA[2*], Marco LERRO[3]

[1]Research assistant, Department of Agricultural Sciences, AgEcon and Policy Group, University of Naples Federico II, Portici, Italy; E-mail: gerarda.caso13@hotmail.com
[2]Research assistant, Department of Agricultural Sciences, AgEcon and Policy Group, University of Naples Federico II, Portici, Italy; E-mail: roberto.freda@unina.it
[3]Research assistant, Department of Law, Economics, Management and Quantitative Methods, University of Sannio, Benevento, Italy; E-mail: mrlerro@unisannio.it
*Corresponding author: Roberto Freda, Via Università, 96. 80055 Portici, Naples, Italy; E-mail: roberto.freda@unina.it

Abstract

Over the last decade, dairy products consumption has increased notably in many countries. Like many popular dairy products, yogurt is showing a considerable consumption growth. Since its initial popularity as a product characterized by high content of calcium, vitamins and minerals, while low fat content; currently, it is consumed either for breakfast or as a snack between meals. In Italy, the yogurt market is steadily increased mainly due to the economic strength of large-scale retailers. This study assesses market values of several yogurt attributes through the estimation of a hedonic price function. The latter relates the price of a yogurt to its attributes showing the relationship occurring between price and the yogurt attributes representing the Italian market. The hedonic analysis revealed that the price is mainly affected by the organic certification, the two-compartments packaging and drinking formula. Further, consumers are willing to pay more for market leader brands than private labels. The study findings offer useful insights to food companies that aim to successfully deliver a new yogurt on the market, focusing on the attributes more appealing to consumers.

Keywords: *yogurt; hedonic price model; Italian market; quality attributes.*

1. Introduction

Over the last decades, the production and consumption of dairy products have increased steadily worldwide (Prasannan, 2017; IMARC Group, 2019). Like many products in this category, yogurt is showing a considerable consumption growth (International Dairy Federation, 2018; CREA, 2017). For instance, the whole organic yogurt reached in 2018 a double-digit growth (i.e. 12%) compared to the previous twelve months (SINAB, 2019). In Italy, the yogurt market, is considered one of the most promising in the dairy sector. Indeed, in terms of domestic demand, it accounts for twelve percent of the whole sector (ISMEA, 2018, 2019; Nielsen, 2018). Nowadays, along with the positive and steady economic trend, the sector has shown notably innovativeness delivering on the market new products in terms of taste and packaging (Borrello et al., 2017). The modern consumption habits and lifestyles has driven consumers to look for unique and differentiated products (Nazzaro et al., 2019; Lerro et al., 2019) able to meet the expectations of both mass market and specific target of consumers (Das et al., 2019; Freda et al., 2015). For instance, food companies are widening their product range with the adoption of the so-called super food for the creation of functional products, or implementing new textures which make yogurt look like a gourmet product (Caracciolo et al., 2018). Although, yogurt is still considered as a genuine, nourishing and healthy product (Bimbo et al., 2018), consumers are focusing on many more and different attributes when making their purchasing decisions (Lerro et al., 2016; Lombardi et al., 2015). Specifically, on one hand, they are looking for products produced by farmers in a traditional way, that are expression of traditions and typical characteristics of a territory (Nazzaro et al., 2018). On the other, they want products that add to the taste also health benefits (Migliore et al., 2015; Pascucci et al., 2013). Recently, consumers' consumption habits have changed further. Yogurt, in fact, along with the more traditional consumption at breakfast or as a snack, is becoming a real meal replacement. Food companies are moving in this direction satisfying their expectations with new packaging and formula such as the two-compartments product (i.e. yogurt with a separate compartment containing fruit, cereals etc.) that well suit a lunch break in the office.

The current paper aims to assess several yogurt attributes by implementing a hedonic price analysis. The latter assesses the attribute values by relating the yogurt price to its attributes. Although, hedonic price analysis was largely applied to investigate different food product such as pasta (Cembalo et al., 2008), milk (Bimbo et al., 2016), oil (Cavallo et al., 2018) and wine (Nerlove, 1995; Schamel, 2006; Boatto et al., 2011; Caracciolo et al., 2013; Di Vita et al., 2015), it is scarcely used to analyze the contribution of each yogurt attributes to the final price (Carlucci et al., 2013; Bimbo et al., 2014).

The paper is structured as follow. The following section summarizes the methodology implemented in the study describing the data gathering procedure, the main descriptive statistics and the hedonic price model. Lastly, the study findings are presented and fully discussed in the "Result and discussion" section, while conclusions are drawn in the last section of the paper.

2. Methodology

2.1. Data gathering

Data gathering was carried out through direct observation in different grocery stores close to Naples, the largest city in

Campania region in Italy. Accordingly, the yogurt attributes and prices investigated are consistent with the most common scenario in which consumers make their purchasing decisions. The analysis has involved 509 yogurts of different brands on the market embracing both the market leaders (e.g. among others Danone, Granarolo, Muller, Parmalat) and private labels (e.g. among others Auchan, Coop, Carrefour). One person was in charge to visit the selected store and collect yogurt attributes and prices. Table 1 describes, in detail, the yogurt attributes assessed in the study.

Table 1.
Attributes selected for the analysis

Variable	Type	Description
Price	Continuous variable	Yogurt price (euro/kg)
Brand	Dummy	Yogurt of market leader Brand = 1; Otherwise = 0
Private label	Dummy	Yogurt of private label Private label = 1; Otherwise = 0
Promotion	Dummy	Store promotion Promotion = 1; Otherwise = 0
Functional	Dummy	Yogurt with health benefits Functional = 1; Otherwise = 0
Drinking	Dummy	Drinking yogurt Drinking = 1; Otherwise = 0
Velvety	Dummy	Velvety texture of yogurt Velvety = 1; Otherwise = 0
Tasty	Dummy	Yogurt with added sugars and a texture like a dessert Tasty = 1; Otherwise = 0
Flavored	Dummy	Yogurt flavored (e.g. fruit, coffee, vanilla) Flavored = 1; Otherwise = 0
Two-compartments	Dummy	Two-compartment yogurt (e.g. cereals, biscuits) Two-compartments = 1; Otherwise = 0
Organic	Dummy	Yogurt with organic certification Organic = 1; Otherwise = 0
Vitamins	Continuous variable	Yogurt enriched with vitamins
Weight	Continuous variable	Yogurt weight in grams
Product unit	Categorical variable	Number of yogurt pots per pack
Proteins	Continuous variable	% of Proteins * 100 grams of yogurt
Carbohydrates	Continuous variable	% of Carbohydrates *100 grams of yogurt
Fats	Continuous variable	Fat content in grams * 100 grams of yogurt
Kcal	Continuous variable	Kcal *100 grams of yogurt

Starting from the analysis of yogurt retail price, the hedonic analysis enables to explain the price changes according to its main attributes.

2.2. Descriptive statistics

Table 2 shows the descriptive statistics of the attributes investigated in the study. The results reveal a wide variability in yogurt price comprised in a range of 1.58 euro/kg and 9.54 euro/kg (Mean: 5.33 euro/kg).

Variable	Mean	Std.dev	Min	Max
Price	5.33	1.36	1.58	9.54
Brand	0.56	0.50	0	1
Private label	0.07	0.25	0	1
Promotion	0.03	0.18	0	1
Functional	0.28	0.45	0	1
Drinking	0.15	0.36	0	1
Velvety	0.32	0.47	0	1
Tasty	0.11	0.31	0	1
Flavored	0.31	0.46	0	1
Two-compartments	0.14	0.35	0	1
Organic	0.06	0.24	0	1
Vitamins	0.07	0.26	0	1
Weight	181.71	257.62	65	2000
Product unit	2.17	2.02	1	10
Proteins	3.64	0.72	1.3	6.5
Carbohydrates	13.29	3.64	3.3	25.2
Fats	2.75	1.91	0.1	10
Kcal	95.71	27.92	28	280

Table 2. Descriptive statistics of the attributes investigated

The 509 yogurts investigated mainly consist of market leader (i.e. 56% of the total sample), while the remaining 44 percent includes private label (7%) and secondary brands (37%). As for the attributes, one out of three yogurts is classified as velvety (32%), shortly followed by flavored (31%) and functional (28%). Markedly lower are the yogurts with the attributes: tasty (i.e. 11% of the total sample), enriched with vitamins (7%) and organic (only 30 out of 509 yogurts investigated). The product packaging also plays a crucial role to meet consumers' expectations. Indeed, roughly a third of the yogurt examined (i.e. 150) are in a bottle or have a two-compartments packaging, features increasingly sought by a generation of consumers always on the move and with little time available. The product weight ranges from a minimum of 65 grams (the traditional cup) to a maximum of 2 kilograms (the spare cup) (*Mean*: 181 grams), while yogurt is sold in store either in single pack or multipack (i.e. up to 10 cups). On average, the yogurts analyzed have a caloric content of 95.71 kcal (± 27.92), 3.64 grams of proteins (± 0.72) and a fat content of 2.75 grams (± 1.91). Lastly, when the analysis was run only three percent of the yogurts on the market were in promotion.

An explorative analysis – on single yogurt attributes – was run to explore the effect of the main attributes (Kcal, Proteins, Carbohydrates and Fats) on yogurt price (figure 1). The analysis shows that as the Kcal goes up, the yogurt price decrease (figure 1A). The major consumption is for yogurt with 200 kcal/kg and in the price range 5-6 euro/kg. Conversely, the price follows the same trend of proteins content that rises with the increasing of proteins (figure 1B). The majority of products investigated have about 4 grams of proteins and a price in the range 5-6 euro/kg. Lastly, carbohydrates content is associated with a lower price, while fats with a higher one (figure 1 C and D respectively). However, since this analysis consider a single attribute, it may misinterpret their real effect on the price. Accordingly, a clear evaluation of the implicit price associated with each attribute can be obtained investigating price variation as a function of all attributes simultaneously.

2.3. Hedonic price model

The hedonic price analysis is based on the Lancaster's theory (1966). It is an indirect method to assess economically a

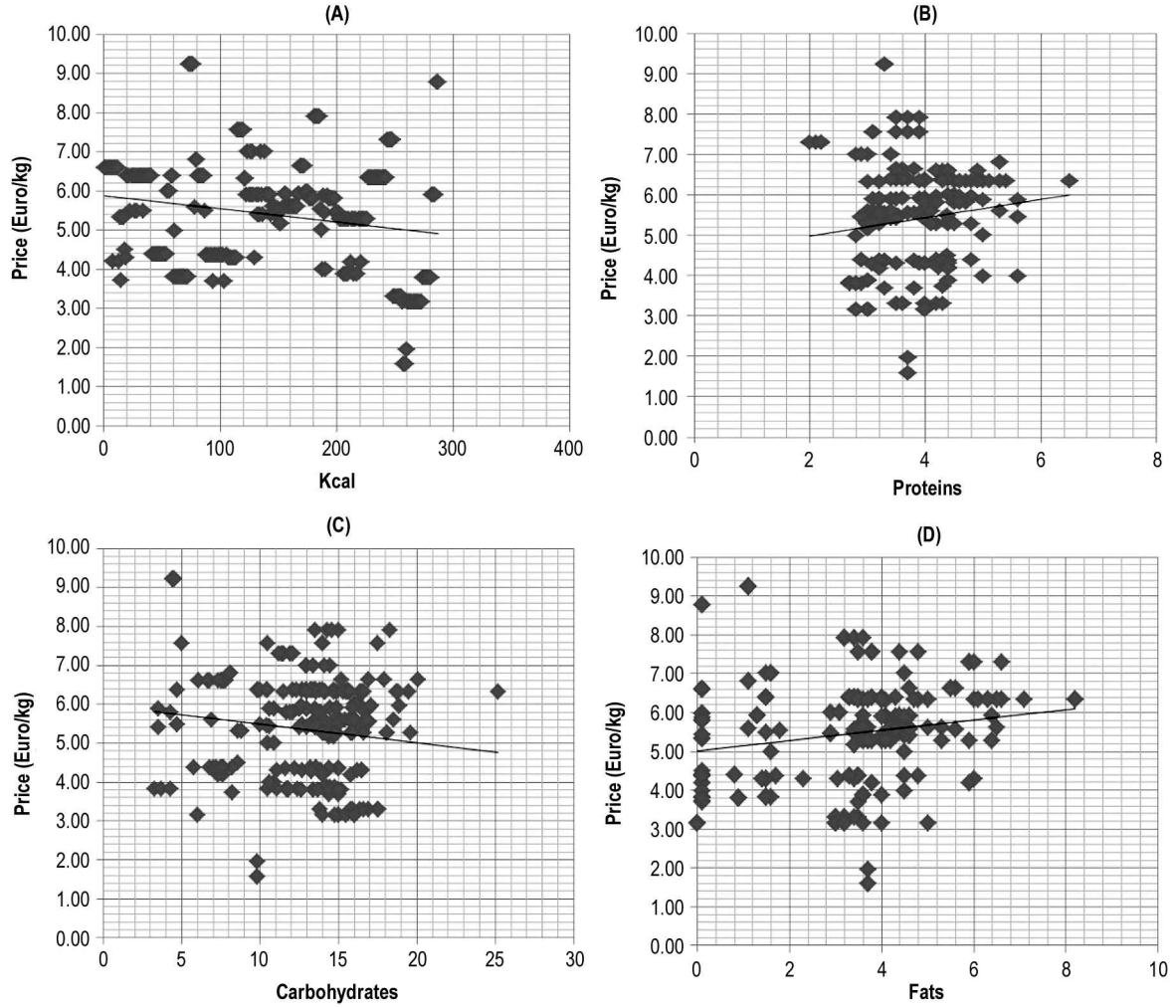


Figure 1. Single attribute analysis
(A): Relation price-kcal; (B): Relation price-proteins;
(C): Relation price-carbohydrates; (D): Relation price-fats.

good. The latter is obtained detecting the market price that, in turn, include the value of each attribute. It is suitable every time the price of a private good is sensitive to its characteristics (Livengood, 1983). The hedonic analysis implies two distinctive steps:

1. the implicit marginal prices of product attributes are estimated using the hedonistic price equation;
2. the implicit marginal prices are applied to estimate the inverse demand functions for the product attributes.

The bottom line of the hedonic analysis is that the total utility deriving from the consumption of a good can be deemed as coming from the combination of the utility coming from the single attributes (Lancaster, 1966; Muelbauer, 1974). So stated, the hedonic analysis allows to analyze the contribution of attributes to the final market price. It is done by assigning an implicit price (i.e. they are not directly observable) obtained by the market price (i.e. explicit price). Since they express the contribution – to the change in the total price – given by the variation in the attribute, these prices are also defined as marginal prices.

As for the current study, the hedonic price analysis is able to break down the overall market value of the yogurt, in the value of each attribute characterizing it. The result is the contribution of each attribute to the overall utility coming from the product. More in detail, Q is the amount of yogurt and qi each unit of Q that can be described by a n-dimensional vector of its characteristics x_i. Accordingly, the hedonic price function of a generic product q_i can be formally express as a function of its characteristics (Freeman, 2003; Rosen 1974):

$$P_{q_i} = P_q\left(x_{i1},...,x_{ij},.....x_{in}\right) \quad (1)$$

The function P_q is the hedonic function for *Q*.

If P_q can be estimated from the observations of the yogurt prices and attributes, then the price of each product variety can be determined from its characteristics. The implicit marginal price of an attribute can be determined by differentiating the implicit price function of the attribute that for a generic attribute x_j can be written as:

$$\partial P_q / \partial x_j = P_{xj}\left(x_j\right) \quad (2)$$

It provides the increase in expenditure required to obtain a product with one more unit of x_j, holding all other attributes constant.

3. Result and discussion

The hedonic model, estimated with the OLS method, is expressed as follows:

$$Price = \beta_0 + \beta_1 brand + \beta_2 privatelab + \beta_3 promotion + \beta_4 functional + \beta_5 velvety + \beta_6 drinking + \beta_7 organic + \beta_8 two\text{-}compartments + \beta_9 vitamins + \beta_{10} tasty + \beta_{11} flavored + \beta_{12} weight + \beta_{13} product\_unit + \beta_{14} proteins + \beta_{15} carbohydrates + \beta_{16} fats + \beta_{17} kcal + \varepsilon \quad (3)$$

The retail price of the yogurt is the dependent variable in the empirical equation of hedonic model. The independent variables

are classified in categorical (i.e. product unit), continuous (i.e. grams, proteins, carbohydrates, fats and kcal) and dichotomous (i.e. price, brand, private label, promotion, functional, drinking, velvety, tasty, flavored, two-compartments, organic).

Table 3 summarizes the econometric analysis results. The linear functional form of the equation enables to interpret the coefficients as the implicit prices as well as to obtain information about the effect of each attribute. The empirical model is able to explain the variability of the data set (R^2: 0.675).

Variable	Coef.	Std. Err.	T	P>t
Brand	0.710	0.271	2.62	0.009
Private label	-2.614	0.380	-6.87	0.000
Promotion	-1.624	0.254	-6.39	0.000
Functional	0.244	0.137	1.78	0.077
Drinking	0.943	0.194	4.85	0.000
Velvety	-0.794	0.143	-5.57	0.000
Tasty	-0.285	0.165	-1.73	0.085
Flavored	-0.023	0.127	-0.18	0.858
Two-compartments	1.125	0.180	6.23	0.000
Organic	1.183	0.400	2.96	0.003
Vitamins	-0.426	0.182	-2.35	0.020
Weight	-0.001	0.000	-4.52	0.000
Product unit	-0.174	0.034	-5.19	0.000
Proteins	-0.060	0.088	-0.69	0.492
Carbohydrates	-0.169	0.023	-7.42	0.000
Fats	-0.103	0.043	-2.38	0.018
Kcal	0.021	0.003	6.08	0.000
Constant	6.411	0.585	10.94	0.000

Table 3. Econometric model results

While the attributes protein, flavored, functional and tasty are not statistically significant, all other attributes investigated affect – with different magnitude and sign – the dependent variable (i.e. price). Yogurt is a product often sold in promotion due to its short-term expiration date that make the product easily perishable. The attribute promotion provides a discount of 1.624 euro/kg compare to the competitor brand, making it very relevant for consumers who eat yogurt daily. The attribute weight also affects negatively the price. Indeed, as the product weight increases, the price decreases compared to single yogurt cup and unit of product. The analysis shows that consumers are not willing to pay more than 6.240 euro/kg for the product. Private label, instead, is perceived as a convenient product compared to the well-known market leader yogurts. Consumers spend less than 2.614 euro/kg for private label and 0.710 euro/kg more for market leaders.

To meet consumers' expectations, producers constantly innovate their products, differentiating their offer on the market, with new texture (as velvety), new product formula (e.g. enriched with vitamins, functional) and certified raw materials (i.e. organic). Specifically, consumers are willing to pay less for a velvety and enriched with vitamins yogurt, -0.794 euro/kg and -0.426 euro/kg respectively. Although, consumers are greatly attracted by functional yogurt, it is not statistically significant in this analysis. By contrast, organic certification is a quality attribute for the consumer who is willing to pay 1.183 euro/kg more to reward the use of organic certified raw materials (e.g. milk and fruit).

Considering the modern consumer requests for healthier food products, fat content adversely affects the final price of yogurt of 0.28 euro/kg. On the same line, a yogurt with a higher content in carbohydrates is perceived by consumers of lower quality and assessed with a discount of -0.169 euro/kg.

The packaging is an attribute increasingly searched by consumers of different generational cohorts. The analysis, in fact, revealed that consumers spend 0.943 euro/kg more for the drinking attribute and 1.125 euro/kg for the two-compartments one.

Figure 2 shows the hedonic price of each attribute investigated in the study.

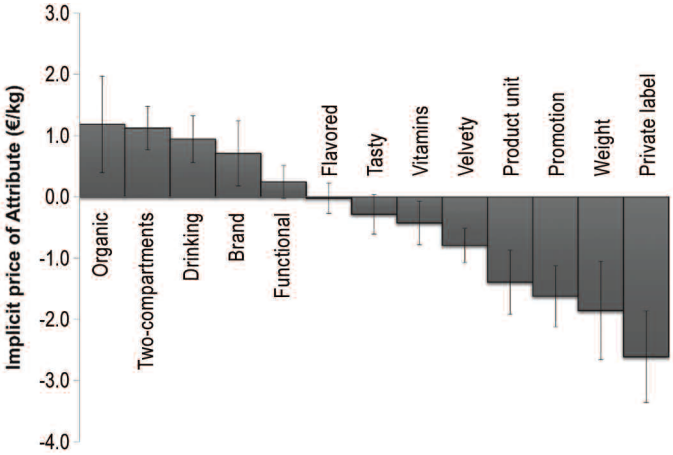


Figure 2. Results of the hedonic price analysis

4. Conclusion

The current study focused on the dairy sector and in particular on yogurt. The latter is a highly differentiated product, characterized by a positive economic momentum worldwide and a high innovation rate (International Dairy Federation, 2018; Das et al., 2019). To assess the effect that each attribute has on the retail price, the analysis investigated 509 yogurts. The hedonic analysis revealed that the price is mainly affected by the organic certification, the two-compartments packaging and drinking formula. The latter reveal the enormous investments carried out by food companies in research and development, focusing on high quality raw materials and an innovative packaging able to meet the current consumers' preferences (Caracciolo et al., 2019). Further, the study findings reveal willingness of consumers to pay more for market leader brands than private labels, perhaps for the greater trust in the former, able to inspire consumers. However, private label sales are expanding, recording an increase in consumption of 30% with a saving for consumer of 2.614 euro/kg. The results also suggest an interest of consumers for the functional attribute. The reasons may rely on the large investments in advertisements of food companies as well as the concern for healthiness of consumers (Pomarici et al., 2017; Mancini et al., 2015). To this extend, consumers pay attention to the nutritional information on the label, especially with regard to the caloric and fat content. This is consistent with the current commitment of food companies in corporate social responsibility initiatives to raise consumer awareness towards a lower dietary fat intake (Lerro et al., 2018a,b; Marotta, Nazzaro, 2012). Yogurt attributes like taste, vitamins and velvety affect marginally the final price of the product, while product unit and weight have a great impact. Lastly, yogurt price is only slightly affected by attributes such as flavored and proteins content. Accordingly, food companies should invest less on these attributes in the future.

The study findings revealed that food companies investing on organic certification and innovative packaging are rewarded by consumers with a premium price.

These results offer useful insights to food companies that aim to successfully deliver a new yogurt on the market, focusing on the attributes more appealing to consumers and markedly affecting product price.

References

[1] Bimbo, F., Bonanno, A., Liu, X., & Viscecchia, R. (2016). Hedonic analysis of the price of UHT-treated milk in Italy. *Journal of dairy science*, 99(2), 1095-1102.

[2] Bimbo, F., Bonanno, A., Van Trijp, H., & Viscecchia, R. (2018). Body image dissatisfaction and health-enhancing food choices: A pilot study from a sample of Italian yogurt consumers. *British Food*

Journal, 120(12), 2778-2792.
[3] Bimbo, F., Bonanno, A., Viscecchia, R., & Nardone, G. (2014). *Market valuation of health claims' types and strength: the Italian yogurt market* (No. 727-2016-50434).
[4] Boatto, V., Defrancesco, E., & Trestini, S. (2011). The price premium for wine quality signals: does retailers information provision matter? *British Food Journal*, 4-5, 669-679.
[5] Borrello, M., Caracciolo, F., Lombardi, A., Pascucci, S., & Cembalo, L. (2017). Consumers' perspective on circular economy strategy for reducing food waste. *Sustainability*, 9(1), 141.
[6] Caracciolo, F., Amani, P., Cavallo, C., Cembalo, L., D'Amico, M., Del Giudice, T., Freda, R., Fritz, M., Lombardi, P., Mennella, L., Panico, T., Tosco, D., & Cicia, G. (2018). The environmental benefits of changing logistics structures for fresh vegetables. *International Journal of Sustainable Transportation*, 12(4), 233-240.
[7] Caracciolo, F., Cembalo, L., & Pomarici, E. (2013). The hedonic price for an Italian grape variety. Italian Journal of Food Science, 25(3), 289.
[8] Caracciolo, F., Vecchio, R., Lerro, M., Migliore, G., Schifani, G., & Cembalo, L. (2019). Natural versus enriched food: Evidence from a laboratory experiment with chewing gum. *Food Research International*, 122, 87-95.
[9] Carlucci, D., Stasi, A., Nardone, G., & Seccia, A. (2013). Explaining price variability in the Italian yogurt market: a hedonic analysis. *Agribusiness*, 29(2), 194-206.
[10] Cavallo, C., Caracciolo, F., Cicia, G., & Del Giudice, T. (2018). Extra-virgin olive oil: are consumers provided with the sensory quality they want? A hedonic price model with sensory attributes. *Journal of the Science of Food and Agriculture*, 98(4), 1591-1598.
[11] Cembalo, L., Cicia, G., Del Giudice, T., Scarpa, R., & Tagliafierro, C. (2008). Beyond agropiracy: the case of Italian pasta in the United States retail market. *Agribusiness: an international journal*, 24(3), 403-413.
[12] CREA (2017). Annuario dell'agricoltura Italiana. Volume LXXI. *Report*. Available at: https://www.crea.gov.it/dam/jcr:b112f290-542a-4369-98c9-64e90bda141b/Annuario_2017.pdf
[13] Das, K., Choudhary, R., & Thompson-Witrick, K. A. (2019). Effects of new technology on the current manufacturing process of yogurt-to increase the overall marketability of yogurt. *LWT - Food Science and Technology*, 108, 69-80.
[14] Di Vita, G., Caracciolo, F., Cembalo, L., Pomarici, E., & D'Amico, M. (2015). Drinking wine at home: Hedonic analysis of sicilian wines using quantile regression. *American Journal of Applied Sciences*, 12(10), 679-688.
[15] Freda, R., Borrello, M., & Cembalo, L. (2015). Innovation in floriculture when environmental and economics criteria are conflicting. *Quality-Access to Success*, 16 (S1), 110-117.
[16] Freeman, A. M. (2003). *The Measurement of Environmental and Resource Values: Theory and Methods*. Washington, DC: Resources for the Future.
[17] IMARC Group - International Market Analysis Research and Consult (2019). Yogurt Market - Global Industry Trends, Share, Size, Growth, Opportunity and Forecast 2019-2024. In: IMARC Group (eds) *Food and Beverage Report*.
[18] International Dairy Federation. (2018). The World Dairy Situation 2018. *Bulletin of International Dairy Federation*, 494/2018.
[19] ISMEA (2018). Settore lattiero caseario – Scheda di settore. *Report 2018*. Available at: http://www.ismeamercati.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/3521#MenuV
[20] ISMEA (2019). Settore lattiero caseario – Tendenze. *Report n.1/2019*. Available at: http://www.ismeamercati.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/9479
[21] Lancaster, K. J. (1966). A new approach to consumer theory. *Journal of political economy*, 74(2), 132-157.
[22] Lerro, M., Caracciolo, F., Vecchio, R., & Cembalo, L. (2018a). Consumer's Side of Corporate Social Responsibility: A Nonhypothetical Study. *Journal of Consumer Affairs*, 52(3), 689-710.
[23] Lerro, M., Raimondo, M., & Freda, R. (2016). Determinants of corporate social responsibility support: A consumers' perspective. *Quality-Access to Success*, 17 (S1), 172-180.
[24] Lerro, M., Raimondo, M., Stanco, M., Nazzaro, C., & Marotta, G. (2019). Cause Related Marketing among Millennial Consumers: The Role of Trust and Loyalty in the Food Industry. *Sustainability*, 11(2), 535.
[25] Lerro, M., Vecchio, R., Caracciolo, F., Pascucci, S., & Cembalo, L. (2018b). Consumers' heterogeneous preferences for corporate social responsibility in the food industry. *Corporate Social Responsibility and Environmental Management*, 25(6), 1050-1061.
[26] Livengood, K. R. (1983). Value of big game from markets for hunting leases: the hedonic approach. *Land Economics*, 59(3), 287-291.
[27] Lombardi, A., Caracciolo, F., Cembalo, L., Lerro, M., & Lombardi, P. (2015). How does corporate social responsibility in the food industry matter. *New medit*, 14(3), 2-9.
[28] Mancini, P., Marotta, G., Nazzaro, C., & Simonetti, B. (2015). Consumer behaviour, obesity and social costs. The case of Italy. *International Journal of Business and Society*, 16(2), 295-324.
[29] Marotta, G., & Nazzaro, C. (2012). Responsabilità sociale e creazione di valore nell'impresa agroalimentare: nuove frontiere di ricerca. *Economia agro-alimentare*, Franco Angeli, Milano, 14, 13-54.
[30] Migliore, G., Schifani, G., Romeo, P., Hashem, S., & Cembalo, L. (2015). Are farmers in alternative food networks social entrepreneurs? Evidence from a behavioral approach. *Journal of Agricultural and Environmental Ethics*, 28(5), 885-902.
[31] Muellbauer, J. (1974). Household production theory, quality, and the "hedonic technique." *The American Economic Review*, 64(6), 977-994.
[32] Nazzaro, C., Lerro, M., & Marotta, G. (2018). Assessing parental traits affecting children's food habits: an analysis of the determinants of responsible consumption. *Agricultural and Food Economics*, 6(1), 23.
[33] Nazzaro, C., Lerro, M., Stanco, M., & Marotta, G. (2019). Do consumers like food product innovation? An analysis of willingness to pay for innovative food attributes. *British Food Journal*, 121(6), 1413-1427.
[34] Nerlove, M. (1995). Hedonic price functions and the measurement of preferences: The case of Swedish wine consumers. *European economic review*, 39(9), 1697-1716.
[35] Nielsen (2018). *Panel Consumer Service*. Available at: https://www.nielsen.com/eu/en.html
[36] Palmquist, R.B. (1991). *Hedonic methods*. In: Braden, J.B. and Kolstad, C.D. (eds.). *Measuring the demand for environmental quality*, pp77-120. North Holland, Amsterdam.
[37] Pascucci, S., Lombardi, A., Cembalo, L., & Dentoni, D. (2013). Governance mechanisms in food community networks. *Italian Journal of Food Science*, 25(1), 98-104.
[38] Pomarici, E., Lerro, M., Chrysochou, P., Vecchio, R., & Krystallis, A. (2017). One size does (obviously not) fit all: Using product attributes for wine market segmentation. *Wine Economics and Policy*, 6(2), 98-106.
[39] Prasannan, A. (2017). Yogurt Market by Type (Set Yogurt, Greek Yogurt, Yogurt Drinks, and Frozen Yogurt) and Distribution Channel (Supermarkets/Hypermarkets, Independent Retailers, Specialist Retailers and Convenience Stores) - Global Opportunity Analysis and Industry Forecast, 2017-2023. In: Allied Market Research (eds) *Market research report*.
[40] Rosen, S. (1974). Hedonic prices and implicit markets: product differentiation in pure competition. *Journal of political economy*, 82(1), 34-55.
[41] Schamel, G. (2006). Geography versus brands in a global wine market. *Agribusiness: An International Journal*, 22(3), 363-374.
[42] SINAB (2019). *Bio in cifre 2018. Report*. Available at: http://www.sinab.it

Analysis of Nutritional and Mineral Composition of Wasted Peels from Apple and Pear

Vanya ZHIVKOVA

University of Economics – Varna, blvd "Kniaz Boris I" 77, 9002 Varna, Bulgaria
E-mail: v_jivkova@abv.bg

Abstract

In this work, the results of the analysis of nutritional and mineral composition of apple and pear wasted peels were presented. Compared to the nutritional composition of apple wasted peels, pear wasted peels were richer in crude protein (0.57%), total dietary fibre (6.01%), digestible carbohydrates (15.8%), total sugars (11.67%), reducing sugars (9.58%) and dry matter (22.9%). The two samples tested were characterized by the same total ash content (0.28%). In terms of mineral composition, apple wasted peels were richer in the elements K (1374 mg/kg), P (189 mg/kg), Mg (152 mg/kg), S (98.2 mg/kg), Na (28.7 mg/kg), Al (9.25 mg/kg), Fe (5.76 mg/kg), B (4.70 mg/kg) and Mn (1.62 mg/kg) compared to pear wasted peels.

Keywords: *apple wasted peels; pear wasted peels; nutritional composition; mineral composition.*

1. Introduction

The waste materials from the fruit and vegetable processing (peels, seeds, stones) could be successfully used as a source of phytochemicals and antioxidants (Joshi, Kumar A. & Kumar V., 2012). According to Dhillon, Kaur & Brar (2013), large quantities of apple industry wastes were generally dumped in landfills and caused environmental pollution. Due to the developments in fermentation and bioprocess technology, these wastes could be biotransformed into value products (Dhillon, Kaur & Brar, 2013). In the review by Mahawar, Singh & Jalgaonkar (2012), it is noted that after processing apple into juice or juice concentrate, the left over material is pomace which is usually discarded. Apple pomace has potential for conversion into several industrial and edible products (Mahawar, Singh & Jalgaonkar, 2012). In their study, Royer et al. (2006) optimized the production of jelly from apple pomace and quince which increased pectins content and improved taste, based on a consumer preference test (Royer et al. 2006). Nawirska & Kwaśniewska (2005) compared the amounts of particular dietary fibre fractions in the fruit and vegetable processing wastes, including apple and pear pomace (Nawirska & Kwaśniewska, 2005). Nawirska & Uklańska (2008) determined and compared the contents of neutral and acidic dietary fibre fractions in the pomace of selected fruits and vegetables, including pomace from the processing of two apple varieties (Nawirska & Uklańska, 2008). In the review paper by Shalini & Gupta (2010), the utilization of apple pomace from apple processing industries for the development of various products was reviewed (Shalini & Gupta, 2010). Kabir et al. (2015) determined the relative content of phenolics in extracts from fruit and vegetable wastes and by-products, including immature apple and immature pear, and evaluated their antioxidant and cytoprotective activities (Kabir et al. 2015). Hernández-Alcántara, Totosaus & Pérez-Chabela (2016) determined the total fibre content, antioxidant and prebiotic activities for three ingredients agro industrial co-products, including apple peel (Hernández-Alcántara, Totosaus & Pérez-Chabela, 2016). Delpino-Rius et al. (2018) determined and analyzed the composition of the primary and secondary metabolites of processed fibres by the juice industry, including fibre from apple and pear (Delpino-Rius et al. 2018). Huc-Mathis et al. (2019) studied the emulsifying properties of two food by-products: apple pomace and oat bran (Huc-Mathis et al. 2019). According to Kolanowski & Zakrzewska (2019), the oil extracted from apple pomace seeds contained a high level of unsaturated fatty acids (Kolanowski & Zakrzewska, 2019).

Arhoun et al. (2013) investigated the biomethanization of pear residues using the anaerobic sludge obtained from municipal wastewater treatment plant (Arhoun et al. 2013). Kafle & Kim (2013) evaluated the performance of anaerobic digesters for the treatment of apple waste with swine manure (Kafle & Kim, 2013). Kopčić et al. (2014) investigated feasibility of co-composting of apple and tobacco solid waste in the laboratory-scale thermally insulated reactor (Kopčić et al. 2014). Dias, Fragoso & Duarte (2014) investigated the co-digestion of pear waste (non-marketable pears) with dairy cattle manure under mesophilic conditions in a completely mixed stirring tank reactor (Dias, Fragoso & Duarte, 2014). Dubrovskis & Plume (2017) studied the potential of biogas production from vegetable processing plant residues and wastes, including apples (Dubrovskis & Plume, 2017). Evcan & Tari (2015) produced bioethanol from apple pomace hydrolysate using cocultures (Evcan & Tari, 2015). Pathania, Sharma & Handa (2018) studied the potential of *Rhizopus delemar* F_2 in utilizing apple pomace under solid state fermentation (Pathania, Sharma & Handa, 2018). Chen et al. (2019) designed an one-pot process for isolating nanocellulose from pear peel residue by applying hydrogen peroxide as an oxidant and chromium (III) nitrate as metal salt catalyst in the acidic medium (Chen et al. 2019).

Li et al. (2014) researched the contents of total phenolics, flavonoids and triterpenes in peels and flesh of ten different pear varieties (Li et al. 2014). Maniyan, John & Mathew (2015) evaluated the peels of different fruits including apple peels for some nutritional and anti-nutritional components (Maniyan, John & Mathew, 2015). Maslovarić et al. (2015) investigated the possibility to transform apple pomace to an acceptable form for feed manufacturers in terms of stability, storage and handling. For this purpose, Maslovarić et al. (2015) used pelleting process

and evaluated pelleting properties of apple pomace (Maslovarić et al. 2015). Kolniak-Ostek (2016) evaluated pears for content of sugars, organic acids, triterpenoids, phenolic compounds and antioxidant potential in pear pulp, peel, seeds and leaves (Kolniak-Ostek, 2016). Mir et al. (2017) studied the influence of apple pomace on the chemical, antioxidant and sensory properties of brown rice crackers (Mir et al. 2017). Rana et al. (2015) investigated the functional properties, phenolic content and antioxidant activity of differently dried fibre fractions from apple pomace (Rana et al. 2015). According to Perussello et al. (2017), extraction of bioactive compounds is an alternative for the valorization of apple pomace, as it is a good source of polyphenols and pectin (Perussello et al. 2017). The article by Shafiee (2017) reviewed the possibilities of utilization of apple pomace (Shafiee, 2017). In their study, Pérez-Jiménez & Saura-Calixto (2018) evaluated total polyphenol content in peels from different fruits, including apple and pear (Pérez-Jiménez & Saura-Calixto, 2018). Xu et al. (2016) determined the phenolic content and the antioxidant activity of apple seed extracts, in comparison with peel and flesh extracts (Xu et al. 2016). Sun et al. (2016) carried out a research on innovation and practice of pressing pre-peeled apple, proposed a concept of whole apple utilization, reviewed apple processed into various products (Sun et al. 2016). Wojdalski et al. (2016) investigated the energy consumption of the pressure agglomeration process of dry apple pomace, and selected physicochemical properties of compressed material (Wojdalski et al. 2016). Szymańska-Chargot et al. (2017) conducted comprehensive study of apple, carrot, cucumber and tomato pomaces for valorization purposes (Szymańska-Chargot et al. 2017). In the research by Yates et al. (2017), apple pomace (an industrial waste from apple and cider production) has been multi-valorized by sequential treatment into different value added substances and materials (Yates et al. 2017). Szymańska-Chargot et al. (2019) evaluated the morphology and structure of cellulose fibrils from apple fruits and carrot roots (Szymańska-Chargot et al. 2019). According to Shen et al. (2019), improved potassium nutrition probably contributes to the development of vascular bundles in pear petioles and peduncles, which function in the transport of nutrients and organic compounds (Shen et al. 2019).

The aim of the present study is to analyze the nutritional and the mineral composition of wasted peels from apple and pear.

2. Materials and Methods

Apple and pear wasted peels were used as experimental material in this research. The samples analyzed were obtained from the local market and were examined in the SGS Bulgaria Ltd, Laboratory Varna. Apple and pear wasted peels were tested for the following parameters: free fat (BDS 6997:1984), crude protein (BDS ISO 1871:2014), total dietary fibre (AOAC 985.29:1986), carbohydrates (digestible) (VLM 106:2012), total sugars (BDS 7169:1989), reducing sugars (BDS 7169:1989), water content (ISO 1026:1982), dry matter (ISO 1026:1982), total ash (BDS 7646:1982), mineral composition (VLM 40:2009). In the article of Baloch, Xia & Sheikh (2015), methodologies described in details could be found.

3. Results and Discussion

In table 1, the results for the nutritional composition of apple and pear wasted peels were presented.

The free fat content and the water content were higher in apple wasted peels (0.27% and 83.6%, respectively) than in pear wasted peels (0.12% and 77.2%, respectively). The analyzed wasted peels from apple and pear were characterized by the same value of total ash (0.28%). Pear wasted peels were richer in crude protein (0.57%), total dietary fibre (6.01%), digestible carbohydrates (15.8%), total sugars (11.67%), reducing sugars (9.58%) and dry matter (22.9%) compared to apple wasted peels.

Parameter, %	Apple wasted peels	Pear wasted peels
Free fat	0.27 ± 0.02	0.12 ± 0.01
Crude protein	0.50 ± 0.15	0.57 ± 0.15
Total dietary fibre	4.32 ± 0.43	6.01 ± 0.50
Carbohydrates (digestible)	11.0 ± 1.7	15.8 ± 2.4
Sugars (total)	9.28 ± 0.25	11.67 ± 0.25
Sugars (reducing)	7.71 ± 0.25	9.58 ± 0.25
Water content	83.6 ± 0.3	77.2 ± 0.3
Dry matter	16.4 ± 0.3	22.9 ± 0.3
Total ash	0.28 ± 0.01	0.28 ± 0.01

Table 1.
Nutritional composition of wasted peels from apple and pear

In table 2, the results for the mineral composition of wasted peels from apple and pear were presented.

Parameter, mg/kg	Apple wasted peels	Pear wasted peels
B	4.70 ± 10 rel.%	3.51 ± 10 rel.%
Na	28.7 ± 10 rel.%	7.09 ± 10 rel.%
Mg	152 ± 5 rel.%	122 ± 5 rel.%
Al	9.25 ± 10 rel.%	2.97 ± 10 rel.%
P	189 ± 5 rel.%	168 ± 5 rel.%
S	98.2 ± 10 rel.%	87.6 ± 10 rel.%
K	1374 ± 5 rel.%	1287 ± 5 rel.%
Ca	121 ± 5 rel.%	204 ± 5 rel.%
Cr	<0.050	<0.050
Mn	1.62 ± 10 rel.%	1.44 ± 10 rel.%
Fe	5.76 ± 10 rel.%	5.39 ± 10 rel.%
Cu	0.63 ± 15 rel.%	1.00 ± 15 rel.%
Zn	0.69 ± 15 rel.%	1.71 ± 10 rel.%
Se	<0.050	<0.050
Mo	<0.050	<0.050

Table 2.
Mineral composition of wasted peels from apple and pear

In both apple and pear wasted peels, the elements Cr, Se and Mo were in quantities below the detectable minimum (<0.050 mg/kg). Apple wasted peels were richer in the elements K (1374 mg/kg), P (189 mg/kg), Mg (152 mg/kg), S (98.2 mg/kg), Na (28.7 mg/kg), Al (9.25 mg/kg), Fe (5.76 mg/kg), B (4.70 mg/kg) and Mn (1.62 mg/kg) compared to pear wasted peels. The elements Ca (204 mg/kg), Cu (1.00 mg/kg) and Zn (1.71 mg/kg) predominated in pear wasted peels.

According to Wolfe & Liu (2003), the apple peel powder ingredient they have developed could increase the phytochemical content and antioxidant activity of foods (Wolfe & Liu, 2003). According to Henríquez et al. (2013), the apple peel powdered ingredients developed could be used in the formulation of functional foods and beverages (Henríquez et al. 2013). According to Sahni & Shere (2018), fruit and vegetable pomace, including apple pomace, could be used as effective functional ingredient in fibre rich bakery products (Sahni & Shere, 2018).

According to Massini et al. (2013), the peels of processed apples can be recovered for further food applications (Massini et al. 2013). According to Catană et al. (2018), powders achieved from apple waste resulting in apple juice industry were important sources of minerals (potassium, iron, magnesium, calcium, zinc), dietary fibres and bioactive compounds (Catană et al. 2018). In the work by Ghinea et al. (2019), the physical and chemical characteristics of fruit and vegetable waste, including apple pomace and peel, were determined in order to develop a model for food waste composting (Ghinea et al. 2019).

According to the results obtained by Asquer, Pistis & Scano (2013) for pear wastes, the highest content elements were as follows: K (7.86 mg/kg), Zn (1.25 mg/kg), Ca (0.94 mg/kg), Mg (0.68 mg/kg), Cu (0.49 mg/kg), Na (0.29 mg/kg) (Asquer, Pistis & Scano, 2013).

Banu et al. (2007) obtained 82.0% moisture content and

0.2% ash solids in apple waste (Banu et al. 2007). According to Dhillon, Kaur & Brar (2013), both apple pomace and apple pomace ultrafiltration sludge are rich sources of carbohydrates, minerals, dietary fibres, vitamins (Dhillon, Kaur & Brar, 2013).

Compared to our results, Kandari & Gupta (2012) obtained the following values for the composition of extract from apple peels: total sugars (21.6%), fermentable sugars (14.4%), non-fermentable sugars (7.2%), protein (2.24%), lipids (0.051%), dry weight (5.15%) (Kandari & Gupta, 2012).

Kuppusamy, Venkateswarlu & Megharaj (2017) obtained the following results for the mineral composition of apple pomace: 8.2 mg/g K, 0.8 mg/g P, 0.2 mg/g Ca, 0.3 mg/g Mg, 0.2 mg/g S, 0.04 mg/g Na, 2.4 mg/kg Mn, 1.0 mg/kg Cu, 5.2 mg/kg Fe, 0.04 mg/kg Al (Kuppusamy, Venkateswarlu & Megharaj, 2017).

Maslovarić et al. (2015) obtained the following values for the chemical composition of apple pomace: 7.96% moisture, 5.9% crude protein, 2.26% crude fat, 20.76% crude fibre, 2.06% crude ash, 30.29% total sugars, 27.12% reducing sugars (Maslovarić et al. 2015).

Qureshi et al. (2017) obtained the following results for the chemical composition of apple pomace: 72.4% total sugars, 51.3% reducing sugars, 4.1% proteins, 7.45% lipids, 10.2% pectin (Qureshi et al. 2017).

Compared to our results, Romelle, Rani & Manohar (2016) obtained the following values for the proximate composition of apple peels: 2.80 g/100g crude proteins, 9.96 g/100g lipids, 1.39 g/100g ash, 13.95 g/100g crude fibres, 59.96 g/100g carbohydrates (Romelle, Rani & Manohar, 2016).

In contrast to our results, according to Romelle, Rani & Manohar (2016), the content of the elements in apple peels decreased in the following order: Fe>Ca>Mn>Zn (Romelle, Rani & Manohar, 2016).

4. Conclusions

The analyzed wasted peels from apple and pear were characterized by the same value of total ash (0.28%). The water content and the free fat content were higher in apple wasted peels (83.6% and 0.27%, respectively) than in pear wasted peels (77.2% and 0.12%, respectively). Dry matter (22.9%), digestible carbohydrates (15.8%), total sugars (11.67%), reducing sugars (9.58%), total dietary fibre (6.01%) and crude protein (0.57%) were higher in pear wasted peels than in apple wasted peels. In terms of mineral composition, the elements chromium, selenium and molybdenum were in quantities below the detectable minimum (<0.050 mg/kg) in both apple and pear wasted peels. In apple wasted peels, the content of the elements decreased in the following order: K (1374 mg/kg), P (189 mg/kg), Mg (152 mg/kg), Ca (121 mg/kg), S (98.2 mg/kg), Na (28.7 mg/kg), Al (9.25 mg/kg), Fe (5.76 mg/kg), B (4.70 mg/kg), Mn (1.62 mg/kg), Zn (0.69 mg/kg), Cu (0.63 mg/kg). In pear wasted peels, the content of the elements decreased in the following order: K (1287 mg/kg), Ca (204 mg/kg), P (168 mg/kg), Mg (122 mg/kg), S (87.6 mg/kg), Na (7.09 mg/kg), Fe (5.39 mg/kg), B (3.51 mg/kg), Al (2.97 mg/kg), Zn (1.71 mg/kg), Mn (1.44 mg/kg), Cu (1.00 mg/kg).

References

[1] Arhoun, B., Bakkali, A., El Mail, R., Rodriguez-Maroto, J.M., & Garcia-Herruzo, F. (2013). Biogas production from pear residues using sludge from a wastewater treatment plant digester. Influence of the feed delivery procedure. *Bioresource Technology*, 127, 242-247.

[2] Asquer, C., Pistis, A., & Scano, E.A. (2013). Characterization of fruit and vegetable wastes as a single substrate for the anaerobic digestion. *Environmental Engineering and Management Journa*l, 12(S11), Supplement, 89-92.

[3] Baloch, A.B., Xia, X., & Sheikh, S.A. (2015). Proximate and mineral compositions of dried cauliflower (Brassica Oleracea L.) grown in Sindh, Pakistan. *Journal of Food and Nutrition Research*, 3(3), 213-219.

[4] Banu, J.R., Raj, E., Kaliappan, S., Beck, D., & Yeom, I.-T. (2007). Solid state biomethanation of fruit wastes. *Journal of Environmental Biology*, 28(4), 741-745.

[5] Catană, M., Catană, L., Iorga, E., Lazăr, M.-A., Lazăr, A.-G., Teodorescu, R.I., Asănică, A.C., & Belc, N. (2018). Achieving of functional ingredient from apple wastes resulting from the apple juice industry. *AgroLife Scientific Journal*, 7(1), 9-17.

[6] Chen, Y.W., Hasanulbasori, M.A., Chiat, P.F., & Lee, H.V. (2019). Pyrus pyrifolia fruit peel as sustainable source for spherical and porous network based nanocellulose synthesis via one-pot hydrolysis system. *International Journal of Biological Macromolecules*, 123, 1305-1319.

[7] Delpino-Rius, A., Marsol-Vall, A., Eras, J., Llovera, M., Cubero, M.Á., Balcells, M., & Canela-Garayoa, R. (2018). Bulk industrial fruit fibres. Characterization and prevalence of the original fruit metabolites. *Food Research International*, 111, 1-10.

[8] Dhillon, G.S., Kaur, S., & Brar, S.K. (2013). Perspective of apple processing wastes as low-cost substrates for bioproduction of high value products: A review. *Renewable and Sustainable Energy Reviews*, 27, 789-805.

[9] Dias, T., Fragoso, R., & Duarte, E. (2014). Anaerobic co-digestion of dairy cattle manure and pear waste. *Bioresource Technology*, 164, 420-423.

[10] Dubrovskis, V., & Plume, I. (2017). Biogas from wastes of pumpkin, marrow and apple, *Agronomy Research*, 15(1), 069-078.

[11] Evcan, E., & Tari, C. (2015). Production of bioethanol from apple pomace by using cocultures: Conversion of agro-industrial waste to value added product. *Energy*, 88, 775-782.

[12] Ghinea, C., Apostol, L.C., Prisacaru, A.E., & Leahu, A. (2019). Development of a model for food waste composting. *Environmental Science and Pollution Research*, 26, 4056-4069.

[13] Henríquez, M., Almonacid, S., Lutz, M., Simpson, R., & Valdenegro, M. (2013). Comparison of three drying processes to obtain an apple peel food ingredient. *CyTA – Journal of Food*, 11(2), 127-135.

[14] Hernández-Alcántara, A.M., Totosaus, A., & Pérez-Chabela, M.L. (2016). Evaluation of agro-industrial co-products as source of bioactive compounds: fiber, antioxidants and prebiotic. *Acta Universitatis Cibiniensis Series E: Food Technology*, 20(2), 3-16.

[15] Huc-Mathis, D., Journet, C., Fayolle, N., & Bosc, V. (2019). Emulsifying properties of food by-products: Valorizing apple pomace and oat bran. *Colloids and Surfaces A*, 568, 84-91.

[16] Joshi, V.K., Kumar, A., & Kumar, V. (2012). Antimicrobial, antioxidant and phyto-chemicals from fruit and vegetable wastes: A review. *International Journal of Food and Fermentation Technology*, 2(2), 123-136.

[17] Kabir, F., Tow, W.W., Hamauzu, Y., Katayama, S., Tanaka, S., & Nakamura, S. (2015). Antioxidant and cytoprotective activities of extracts prepared from fruit and vegetable wastes and by-products. *Food Chemistry*, 167, 358-362.

[18] Kafle, G.K., & Kim, S.H. (2013). Anaerobic treatment of apple waste with swine manure for biogas production: Batch and continuous operation. *Applied Energy*, 103, 61-72.

[19] Kandari, V., & Gupta, S. (2012). Bioconversion of vegetable and fruit peel wastes in viable product. *Journal of Microbiology and Biotechnology Research*, 2(2), 308-312.

[20] Kolanowski, W., & Zakrzewska, M. (2019). Apple processing wastes as potential source of new edible oil. *Journal of Food and Nutrition Research*, 58(1), 92-98.

[21] Kolniak-Ostek, J. (2016). Chemical composition and antioxidant capacity of different anatomical parts of pear (Pyrus communis L.). *Food Chemistry*, 203, 491-497.

[22] Kopčić, N., Vuković Domanovac, M., Kučić D., & Briški, F. (2014). Evaluation of laboratory-scale in-vessel co-composting of tobacco and apple waste. *Waste Management*, 34, 323-328.

[23] Kuppusamy, S., Venkateswarlu, K., & Megharaj, M. (2017). Evaluation of nineteen food wastes for essential and toxic elements. *International Journal of Recycling of Organic Waste in Agriculture*, 6, 367-373.

[24] Li, X., Wang, T., Zhou, B., Gao, W., Cao, J., & Huang, L. (2014). Chemical composition and antioxidant and anti-inflammatory

potential of peels and flesh from 10 different pear varieties (Pyrus spp.). *Food Chemistry*, 152, 531-538.
[25] Mahawar, M., Singh, A., & Jalgaonkar, K. (2012). Utility of apple pomace as a substrate for various products: A review. *Food and Bioproducts Processing*, 90, 597-605.
[26] Maniyan, A., John, R., & Mathew, A. (2015). Evaluation of fruit peels for some selected nutritional and anti-nutritional factors, *Emergent Life Sciences Research*, 1(2), 13-19.
[27] Maslovarić, M.D., Vukmirović, Đ.M., Čolović, R.R., Spasevski, N.J., Jovanović, R.D., & Tolimir, N.V. (2015). Pelleting properties and pellet quality of apple pomace. *Food and Feed Research*, 42(2), 147-154.
[28] Massini, L., Rico, D., Martín Diana, A.B., & Barry-Ryan, C. (2013). Valorisation of apple peels. *European Journal of Food Research & Review*, 3(1), 1-15.
[29] Mir, S.A., Bosco, S.J.D., Shah, M.A., Santhalakshmy, S., & Mir, M.M. (2017). Effect of apple pomace on quality characteristics of brown rice based cracker. *Journal of the Saudi Society of Agricultural Sciences*, 16, 25-32.
[30] Nawirska, A., & Kwaśniewska, M. (2005). Dietary fibre fractions from fruit and vegetable processing waste. *Food Chemistry*, 91, 221-225.
[31] Nawirska, A., & Uklańska, C. (2008). Waste products from fruit and vegetable processing as potential sources for food enrichment in dietary fibre. *Acta Scientiarum Polonorum Technologia Alimentaria*, 7(2), 35-42.
[32] Pathania, S., Sharma, N., & Handa, S. (2018). Utilization of horticultural waste (Apple Pomace) for multiple carbohydrase production from Rhizopus delemar F2 under solid state fermentation. *Journal of Genetic Engineering and Biotechnology*, 16, 181-189.
[33] Pérez-Jiménez, J., & Saura-Calixto, F. (2018). Fruit peels as sources of non-extractable polyphenols or macromolecular antioxidants: Analysis and nutritional implications. *Food Research International*, 111, 148-152.
[34] Perussello, C.A., Zhang, Z., Marzocchella, A., & Tiwari, B.K. (2017). Valorization of apple pomace by extraction of valuable compounds. *Comprehensive Reviews in Food Science and Food Safety*, 16, 776-796.
[35] Qureshi, A.S., Khushk, I., Naqvi, S.R., Simiar, A.A., Ali, C.H., Naqvi, M., Danish, M., Ahmed, A., Majeed, H., Jatt, A.N.M., Rehan, M., & Nizami, A.-S. (2017). Fruit waste to energy through open fermentation. *9th International Conference on Applied Energy, ICAE2017*, 21-24 August 2017, Cardiff, UK. *Energy Procedia*, 142, 904-909.
[36] Rana, S., Gupta, S., Rana, A., & Bhushan, S. (2015). Functional properties, phenolic constituents and antioxidant potential of industrial apple pomace for utilization as active food ingredient. *Food Science and Human Wellness*, 4, 180-187.
[37] Romelle, F.D., Rani, P.A., & Manohar, R.S. (2016). Chemical composition of some selected fruit peels. *European Journal of Food Science and Technology*, 4(4), 12-21.
[38] Royer, G., Madieta, E., Symoneaux, R., & Jourjon, F. (2006). Preliminary study of the production of apple pomace and quince jelly. *LWT – Food Science and Technology*, 39, 1022-1025.
[39] Sahni, P., & Shere, D.M. (2018). Utilization of fruit and vegetable pomace as functional ingredient in bakery products: A review. *Asian Journal of Dairy and Food Research*, 37(3), 202-211.
[40] Shafiee, M.N. (2017). Apple pomace: By product utilisation. *IJRAR - International Journal of Research and Analytical Reviews*, 4(4), 190-192.
[41] Shalini, R., & Gupta, D.K. (2010). Utilization of pomace from apple processing industries: a review. *Journal of Food Science and Technology*, 47(4), 365-371.
[42] Shen, C., Shi, X., Xie, C., Li, Y., Yang, H., Mei, X., Xu, Y., & Dong, C. (2019). The change in microstructure of petioles and peduncles and transporter gene expression by potassium influences the distribution of nutrients and sugars in pear leaves and fruit. *Journal of Plant Physiology*, 232, 320-333.
[43] Sun, J., Guo, Y., Xue, J., & Niu, P. (2016). Innovation and practice of separation pre-pressing technology and whole apple utilization. *Journal of Food Processing & Technology*, 7(8), 1000614.
[44] Szymańska-Chargot, M., Chylińska, M., Gdula, K., Kozioł, A., & Zdunek, A. (2017). Isolation and characterization of cellulose from different fruit and vegetable pomaces. *Polymers*, 9, 495.
[45] Szymańska-Chargot, M., Chylińska, M., Pieczywek, P.M., & Zdunek, A. (2019). Tailored nanocellulose structure depending on the origin. Example of apple parenchyma and carrot root celluloses. *Carbohydrate Polymers*, 210, 186-195.
[46] Wojdalski, J., Grochowicz, J., Ekielski, A., Radecka, K., Stępniak, S., Orłowski, A., Florczak, I., Drożdż, B., Żelaziński, T., & Kosmala, G. (2016). Production and properties of apple pomace pellets and their suitability for energy generation purposes. *Annual Set the Environment Protection = Rocznik Ochrona Środowiska*, 18(1), 89-111.
[47] Wolfe, K.L., & Liu, R.H. (2003). Apple peels as a value-added food ingredient. *Journal of Agricultural and Food Chemistry*, 51, 1676-1683.
[48] Xu, Y., Fan, M., Ran, J., Zhang, T., Sun, H., Dong, M., Zhang, Z., & Zheng, H. (2016). Variation in phenolic compounds and antioxidant activity in apple seeds of seven cultivars. *Saudi Journal of Biological Sciences*, 23, 379-388.
[49] Yates, M., Ramos Gomez, M., Martin-Luengo, M.A., Zurdo Ibañez, V., & Martinez Serrano, A.M. (2017). Multivalorization of apple pomace towards materials and chemicals. Waste to wealth. *Journal of Cleaner Production*, 143, 847-853.

Prioritization of Risk Factors Affecting Information Technology (IT) Projects in Malaysia

Sam Yin MUN [1], Shahryar SOROOSHIAN [2*]

[1] Faculty of Industrial Management, Universiti Malaysia Pahang, Pahang, Malaysia
[2] School of Business Economics and Law, University of Gothenburg, Gothenburg, Sweden
* Corresponding author: Shahryar Sorooshian; E-mail: sorooshian@gmail.com

Abstract

In this technology advance era, most of the counties are trend to promote high technological in business development for increase the profitability and market value. The information technology (IT) project having a dynamic and complex nature caused high uncertainty and trend to be risky in any resources or capital loss. There are many risk factors is difficult to manage and mitigate by the project manager unless they try to accept or avoid it in the implementation process. Regardless of the previous studies have focused on the critical success factors in information system and project till date, there are fewer studies emphasis on critical risk factor in IT projects. To address these issues above, this paper aims to Prioritize the main Critical risk factors (CRFs) affecting the IT projects in Malaysia based on Pair-wise comparison. This study is conducted through experts in the IT field company responded to the Pair-wise comparison survey. Besides that, the research questionnaire is a close-ended survey and 22 CRFs have been converted in a matrix form of a table for the respondents to answer based on their judgment, perception, and experience in IT projects. The result showed that the most significant important CRFs affecting IT projects is task distribution and resource coordination, and lack of communication while the finding can contribute to the IT company, other researchers and government sector who intend to expand their opportunities in the IT projects

Keywords: *critical risk factors (CRFs); information technology (IT); information technology project; pair-wise comparison.*

1. Introduction

The information technology (IT) industry are growing rapidly in Malaysia which expand 17.6% of market share in the economy in 2015 and foresee to reach 20% by 2020 (BMCC, 2017). On the other hand, the technology products and service in Malaysia are rising 5.7% from RM 61.6 billion in 2017 to RM 65.2 billion in 2018 but the uncertainty emerges of economy fluctuation have an influence on the industry (Eusoff, 2018). To achieve hype-competition in the IT industry, IT companies should concern about the risk factors arise in the IT projects. This factor is becoming a critical aspect for the company to forecast the future changing where the project managers are essential to aware the potential risk factor may arise in the IT projects. The risk factor may be affecting the IT project is crucial to determine for the project manager to avoid and mitigate in this dynamic economy fluctuation to ensure the IT project bring revenue to their company. From that, IT project become a major platform for the private sector, SME sector and government sectors to develop their opportunities to enhance their profit and productivity in industry.

Generally, IT project is constraint by the scope, schedule, budget, quality standards and expertise with a series of complicate and interrelated activities. Thus, risks identification and evaluation are not being ignored in the IT project. IT project is very useful strategy that helping IT team to enhance the quality of the product and services, and reputation of the company. Typically, IT project is enough to include most software development project and other technology product and architectures which consisted of scientific computing, artificial intelligence, e-commerce, financial software and software development (Spacey, 2015). The utilizing of the computerized IT system become a preferred choice to concentrate on reducing using the human resource on the services at many companies in this recent year (Poolsappasit et al. 2012). On the other hand, the IT project fail is due to 37% of project manager sometimes or rarely and 14% of the project manager is never engaging in project risk management (Giuseppe, 2017; PMI, 2014). Further, there are 30% of undefined opportunities and risks is the primary causes of the IT project failure (Lisa, 2017). Other than that, the Minnesota's IT department declare that MNLARS computer system is failing to concern about risks may affect continues funding crisis for years where it was never obtained the necessary funds to achieve rolling the system and constraint of government policy structure where impeded they to meet client that lead to project failure (Dave, 2018).

Although, a large number of researches are done previously, the failure ratio of IT projects is still very high. Other than this problem that leads to conduct this study, the IT project manager overlooks the importance of identification risks, lack of utilizing the risk management and the lack of understanding about critical risks can bring most significant consequence to the IT projects that will cause project failure. The risk management plays a vital character in determining how to protect the company information assets and fulfill the mission of IT-related risks. Therefore, identify critical risk factors (CRFs) are becoming a key factor in the company where it can reduce the probability and impact of IT projects treats and forecast the risks opportunities that may occur in the IT projects. Literature reveals that all the previous studies emphasized on the critical success factors and risk factors in different methodology, aspect and field, although there are no studies conducting for IT projects with considering the CRFs in IT companies in Malaysia. To access this gap, an objective has been proposed in this study which is to prioritize the main CRFS affecting IT projects based on Pair-wise comparison matrix analysis.

2. Literature Review

2.1. Risk

Based on the PMI, project risk is defined as an uncertainly activity or situation, if it occurs which has either positive or negative influences on the purpose of the project such as budget, schedule and quality and specification (PMI, 2013). The risk is described as an exposure to the opportunity of injury or loss and a hazard or dangerous activity. In other way, risk is the likelihood of an activity and the degree of impact will determine the level of risk in the IT project (Richard et al., 2012). The risk can be classified as the primary and secondary risk in the project (Zuo & Zhang, 2018).

Most of the project risk is represented to the initial risk or primary risk where the project manager crucial to identified and analysed for handle it properly. This indicated that primary risk is the main uncertainty event may have negative or positive influence on the project goal (Bai et al., 2014). The secondary risks are mainly occurring from the implementation of the risks response action of the primary risks. The secondary risk will be being responded through the secondary risk response action, yet it is needing to prevent by imposing the primary risks response action exist. Undeniably, it is depending on the residual risk which is possible still exists after the risks response action that planned (Zuo & Zhang, 2018). The residual risks are the risks factor that expected to remain after the response action have been addressed, if it happens the contingency plan should execute for dealing with the residual risks.

2.2. Information Technology Projects and Risk Factors

Information technology (IT) is the application a few layers of tangible equipment, virtualization and administration or computerization electronic devices for storage, framework and processes to create, process, collect, protect and transfer all forms of electronic information (Moore, 2016).The IT consists of a set of technologies that specifically cover the ability of computer to store and process information known as information processing and telecommunication technologies that can transfer information to distances. Information technology is a process of improve knowledge sharing and accelerates the flow of information communication (Mitić et al., 2017). By continuing development of IT can continues to bring new challenges to company for enabling company to improve, learn and adapt to the rapidly change. Information technology includes (1) data processing (digital computers); (2) digital information sources; (3) digital data storage; (4) communication and networks; (5) computer programs and information standards; (6) computer operating systems; and (7) digital sensors (satellite, air, field, lab) and their associated digital infrastructure to convert raw sensor data into information products (Rossiter, 2018).

According to PMBOK, every single project is a temporary activity which undertaken to create a unique product or service (PMI Inc, 2000). Hence, IT project can be descripted as an activity that involved technology advances in science during implementation process, the infrastructure modifications which have an influence on security, information administration and somehow it also involved unknown dependent relationships among software, hardware, data information and network infrastructure. The IT project is much different to the other project type in term of the complexity, uniqueness, varied stakeholders, prototyping and testing strategies (Harrin, 2015).

There are many researchers have identified various type of risks that potential threat the IT projects such as David proposed there are risks factor in seven categories in the IT project and also Lee proposed a framework for evaluate the four risks element co-relationship a global IT project (Baccarini et al. 2004; Lee et al. 2015); Nakatsu introduced risks factor in six categories based on two panel Delphi study (Nakatsu & Iacovou, 2009); Alton develop the risks factors in four categories based on the failure IT project (Chua, 2009); Taylor introduced four categories of risks based on IT project risk management and emphasis practice of risk assessment process to improve the project outcome (Taylor et al. 2012); Bailey proposed that three categories of risks in information technology project and mitigation strategy (Bailey & Riffel, 2010). However, for this study, as shown in table 1, there are 22 critical risk factors affecting information technology (IT) projects have been identified upon the reviewing of existing literature.

Risks	Code	Reference
Multi- stakeholder relations conflict	R1	(Alfaadel et al., 2012; Liu et al., 2010; Nakatsu & Iacovou, 2009; Stewart, 1999)
Lack of communication	R2	(Alfaadel et al., 2012; Hongyan, 2010; Kerzner, 2009)
Heterogeneous IT strategies	R3	(Herbsleb & Moitra, 2001; Levina & Vaast, 2008; Lee et al., 2015; Sarker & Sahay, 2004)
Multi-group knowledge sharing	R4	(Battin et al., 2001; Herbsleb & Moitra, 2001; Taylor et al., 2012)
Task distribution and resource coordination	R5	(Alfaadel et al., 2012; Fairley, 2005; Jiang & Klein, 2000; Kotlarsky et al., 2007; Nakatsu & Iacovou, 2009; Sakthivel, 2005; Schmidt et al., 2001)
Task- technology misfits	R6	(Avdoshin & Pesotskaya,. 2012; Espinosa et al., 2007; Goodhue & Thompson, 1995; Powell et al., 2004)
Incorrect arrangement of business strategies and IT strategies	R7	(Cusumano, 2008; Herbsleb & Moitra, 2001)
Personal agenda among team members	R8	(Baccarini et al., 2004; Chua, 2009; Lee et al., 2015)
Change requests from diverse sources	R9	(Chua, 2009; Lee et al., 2015)
Incompatibility of system/ network/ equipment	R10	(Ahlan & Arshad, 2012; Baccarini et al., 2004; Nakatsu & Iacovou, 2009; Lee et al., 2015)
Uneven skill/ experiences among project members	R11	(Avdoshin & Pestoskaya, 2011; Lee et al., 2015)
Lack of user competency and commitment/ involvement	R12	(Alfaadel et al., 2012; Avdoshin & Pesotskaya, 2011; Chua, 2009; Keil et al., 1998; Nakatsu & Iacovou, 2009; Nelson & Cheney, 1987)
Lack of top management involvement	R13	(Kevin Mason, 2006; Sharma et al., 2008; Tesch et al., 2007; Wallace et al., 2004; Zwikael & Globerson, 2006)
Lack of a clear project goal and value	R14	(Baccarini et al., 2004; Bailey & Riffel, 2010; Chua, 2009; Lee et al., 2006; Morris, 1999)
Inadequate user/ team training	R15	(Dunn, 2001; Fowler & Horan, 2007; Nakatsu & Iacovou, 2009)
Poor/inadequate documentation	R16	(Chadli et al., 2016; Ezamly & Hussin, 2011; Niu, 2009; Lee et al., 2015)
Staffing shortfall	R17	(Avdoshin & Pesotskaya, 2012; Baccarini et al., 2004; Jiang & Klein, 2000; Lee et al., 2015; Ropponen & Lyytinen, 2000)
Business environment risks	R18	(Baccarini et al., 2004; Chua, 2009; Fowler & Horan, 2007; Nakatsu & Iacovou, 2009; Taylor et al., 2012)
Newly technology	R19	(Avdoshin & Pestoskaya, 2012; Hui & Liu, 2004; Liu & Wang, 2014; Schmidt et al., 2001)
Unclear scope and schedule	R20	(Avdoshin & Pestoskaya, 2012; Boehm, 1991)
Insufficient of financial support	R21	(Avdoshin & Pestoskaya, 2012; Fairley, 2005; Ropponen & Lyytinen, 2000; Schmidt et al., 2001; Tesch et al., 2007; Wallace et al., 2004)
Subcontracting and intellectual property	R22	(Karlyn, 2015; Ropponen & Lyytinen, 2000; Sharma et al., 2008)

Table 1. A List of Critical Risk Factors Affecting IT Projects

3. Methodology

In this study, Pair-wise comparison developed for the expert in obtain result through a series of paired comparison formula. By using a set of Pair-wise comparisons analysis for determine the relative weights of the importance of decision criteria and the relative performance measures of alternatives in term of various decision criteria from data collected (Saaty, 2008). The comparison within the standard itself refers to a comparison matrix with paired comparison matrix and a score of one on the column which are compared on the same criteria due to the equally important criteria.

The questionnaire was distributed to 30 IT experts (in Malaysia) for data collection. After that, the data responded is go thru the Pair-wise comparison matrix construction, average Pair-wise comparison matrix, weight determination and weight synthesis for analysis the result of prioritize CRFs affecting IT projects. The first step is construct Pair-wise comparison matrix for all 22 CRFs in calculate the weight of each CRFs that A = n x n, where A = (aij), aij > 0, and aij = 1/aij which "A" refers the alternatives, n refer to number of CRFs in the matrix (Alam et. al., 2012; Koczkodaj & Urban, 2018).

Next, this table of Pair-wise comparison matrix were undergoing an accumulate process from all data from 30 individual respondents' table of matrix which the average data for each of the criteria are calculating through the Microsoft Excel "average" formula.

Afterwards, the average table of matrix will go thru the weight determination where calculate by the sum of each row, and normalizing the local weights (Alam et al., 2012; Hamed, 2017).

Lastly, the priority vectors that show in each row were calculated through the Microsoft Excel "average" formula for obtain the result of prioritizing for critical risk factors from the most to the least importance.

4. Results and Discussion

The 30 experts (respondents) answered two parts of the questionnaire. As demographic information of the experts, table 2, shows, with the position and working experience, these people have high-experience in the field, response the questionnaire in this study.

Demographic	Frequency	Percentage
Gender		
Male	22	73%
Female	8	27%
Position		
Project director	2	7%
Project manager	19	63%
IT manager	9	30%
Age distribution		
< 20	-	-
20-29	3	10%
30-39	10	33&
40-49	17	57%
50-59	-	-
>60	-	-
Education background		
Doctorate (PhD)	3	10%
Master's degree	7	23%
Bachelor's degree	20	67%
Diploma	-	-
Working experience in IT project		
< 2 years	-	-
2-3 years	2	7 %
4-6 years	12	40 %
7-9 years	16	53 %
> 9 years	-	-

Table 2. Respondent's Demographic

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22
R1	1.0000	0.5024	2.6378	2.6467	0.3624	0.1774	1.3038	2.5968	0.6483	1.0049	0.3660	1.0549	0.8489	3.1787	2.3700	1.4422	0.5538	4.8463	0.5061	1.8152	1.1327	2.8733
R2	1.9905	1.0000	4.4721	3.4944	2.9825	1.0221	2.7154	6.0464	2.3068	2.5026	2.0472	1.5675	3.6344	3.5418	1.5214	2.7810	4.4502	4.6926	1.0447	4.0103	5.8976	3.0414
R3	0.3791	0.2236	1.0000	3.5333	0.7967	0.3483	0.9442	3.1926	1.4406	0.6867	0.3514	1.4345	0.9565	1.4345	0.6994	1.0898	1.2383	3.9219	1.4032	1.8006	1.2390	2.1696
R4	0.3778	0.2862	0.2830	1.0000	0.1416	0.2606	2.9694	3.1928	0.1940	0.7725	1.5351	0.4034	2.8128	1.0929	3.6533	1.2620	0.5412	2.6952	0.4789	1.8300	1.5642	2.8070
R5	2.7591	0.3353	1.2551	7.0628	1.0000	4.5198	2.3137	5.4500	2.2560	2.7921	2.8208	4.6389	3.8694	2.3459	4.3500	3.5238	3.8163	5.2044	0.6797	2.3103	3.4156	5.4333
R6	5.6376	0.9783	2.8708	3.8374	0.2212	1.0000	3.5711	4.0800	1.7421	1.1733	1.7225	3.5714	3.7622	5.3400	3.0908	1.1210	2.3071	5.1000	2.5500	3.4381	4.5541	3.3722
R7	0.7670	0.3683	1.0591	0.3368	0.4322	0.2800	1.0000	3.2933	0.5989	0.6423	0.3267	2.6844	3.4483	0.9422	0.4700	0.8905	1.4112	2.7422	0.2687	1.4514	1.2605	4.6000
R8	0.3851	0.1654	0.3132	0.3132	0.1835	0.2451	0.3036	1.0000	0.3145	0.4032	0.3877	0.8949	1.1459	1.5444	1.1067	0.4688	1.7947	3.6625	0.6514	0.9837	1.5731	1.0317
R9	1.5425	0.4335	0.6941	5.1555	0.4433	0.5740	1.6698	3.1794	1.0000	1.4102	1.5441	4.6571	4.0114	2.6292	4.2528	1.8825	3.3976	5.5067	3.7235	3.9714	4.2072	7.2667
R10	1.5425	0.3996	1.4562	1.2946	0.3582	0.8523	1.5570	2.4803	0.7091	1.0000	2.8189	2.3078	2.9622	4.9859	4.0921	2.9273	2.1692	4.6333	0.7833	3.8381	3.7138	5.0444
R11	2.7322	0.4885	2.8455	0.6514	0.3545	0.5805	3.0612	2.5793	0.6476	0.3547	1.0000	6.0389	6.1000	2.5937	0.9581	4.0603	2.4575	5.2229	1.9468	4.4381	3.8599	6.3067
R12	0.9480	0.6380	0.6971	2.4789	0.2156	0.2800	0.3725	1.1174	0.2147	0.4333	0.1656	1.0000	2.3556	0.7769	2.3225	0.8376	1.2565	3.3750	1.1708	1.9937	3.1587	3.8806
R13	1.1780	0.2751	1.0454	0.3555	0.2584	0.2658	0.2900	0.8727	0.2493	0.3376	0.1639	0.4245	1.0000	2.7181	0.7944	0.4529	1.5706	3.6611	0.6102	1.1137	1.8483	3.0000
R14	0.3146	0.2823	0.6971	0.9150	0.4263	0.1873	1.0613	0.6475	0.3803	0.2006	0.3856	1.2872	0.3679	1.0000	2.7689	1.7817	1.6530	4.7778	2.0146	2.5571	2.1993	3.7600
R15	0.4219	0.6573	1.4297	0.2737	0.2299	0.3235	2.1277	0.9036	0.2351	0.2444	1.0437	0.4306	2.5175	0.3612	1.0000	3.2540	1.2961	5.3733	3.6175	2.4830	1.5482	3.1872
R16	0.6934	0.3596	0.9176	0.7924	0.2838	0.8920	1.1230	2.1329	0.5312	0.3416	0.2463	1.1939	2.2082	0.5612	0.3073	1.0000	0.8682	6.0400	2.2500	4.2848	1.3171	4.6000
R17	1.8058	0.2247	0.8076	1.8479	0.2620	0.4335	0.7086	0.5572	0.2943	0.4610	0.4069	0.7958	0.6367	0.6050	0.7716	1.1518	1.0000	4.6407	0.8800	4.0337	3.9521	5.2639
R18	0.2063	0.2131	0.2550	0.3710	0.1921	0.1961	0.3647	0.2730	0.1816	0.2158	0.1915	0.2963	0.2731	0.2093	0.1861	0.1656	0.2155	1.0000	1.9398	0.9805	2.6129	2.1467
R19	1.9760	0.9572	0.7127	2.0882	1.4712	0.3922	3.7212	1.5351	0.2686	1.2766	0.5137	0.8541	1.6389	0.4964	0.2764	0.4445	1.1364	0.5155	1.0000	2.2631	3.7077	4.6378
R20	0.5509	0.2494	0.5554	0.5464	0.4328	0.2909	0.6890	1.0166	0.2518	0.2605	0.2253	0.5016	0.8979	0.3911	0.4027	0.2334	0.2479	1.0199	0.4419	1.0000	0.4137	4.3489
R21	0.8829	0.1696	0.8071	0.6393	0.2928	0.2196	0.7934	0.6357	0.2377	0.2693	0.2591	0.3166	0.5411	0.4547	0.6459	0.7593	0.2530	0.3827	0.2697	2.4175	1.0000	5.2478
R22	0.3480	0.3288	0.4609	0.3563	0.1840	0.2965	0.2174	0.9692	0.1376	0.1982	0.1586	0.2577	0.3333	0.2660	0.3138	0.2174	0.1900	0.4658	0.2156	0.2299	0.1906	1.0000
Total	28.4394	9.5361	27.2726	39.9906	11.5251	13.6375	32.8779	47.7519	14.8403	16.9815	18.6805	36.6121	46.3224	37.4689	36.3544	31.7474	33.8242	79.4800	28.4464	53.2442	54.3662	85.0192

Table 3. Average Pair-wise Comparison Matrix for CRFs affecting IT Projects in Malaysia

The average Pair-wise comparison matrix shown result in Table 3 which consist all individual data collected from questionnaire which go thru the average calculation process for each CRFS affecting IT projects in Malaysia. The Table 4 shown a result of standardization Pair-wise comparison which calculate the priority vector for prioritize the most significant CRFs affecting IT Projects in Malaysia.

Table 5 represent the result of the critical risk factors affecting IT project in accordance that provided a clear and concise to the readers for review the prioritizing from the most importance to the least importance. The result shows that R5 as task distribution and resource coordination are the most important critical risk factors with the priority vector and percentage of 0.105 and 10.46% respectively. The prioritization followed by the second most significant R2 as lack of communication risk with the priority vector 0.0988 or 9.8805 %

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	Priority vector
R1	0.0352	0.0527	0.0967	0.0662	0.0314	0.0130	0.0397	0.0544	0.0437	0.0592	0.0196	0.0288	0.0183	0.0848	0.0652	0.0454	0.0164	0.0610	0.0178	0.0341	0.0208	0.0338	0.0426
R2	0.0700	0.1049	0.1640	0.0874	0.2588	0.0750	0.0826	0.1266	0.1554	0.1474	0.1096	0.0428	0.0785	0.0945	0.0418	0.0876	0.1316	0.0590	0.0367	0.0753	0.1085	0.0358	0.0988
R3	0.0133	0.0234	0.0367	0.0884	0.0691	0.0255	0.0287	0.0669	0.0971	0.0404	0.0188	0.0392	0.0206	0.0383	0.0192	0.0343	0.0366	0.0493	0.0493	0.0338	0.0228	0.0255	0.0399
R4	0.0133	0.0300	0.0104	0.0250	0.0123	0.0191	0.0903	0.0669	0.0131	0.0455	0.0822	0.0110	0.0607	0.0292	0.1005	0.0398	0.0160	0.0339	0.0168	0.0344	0.0288	0.0330	0.0369
R5	0.0970	0.0352	0.0460	0.1766	0.0868	0.3314	0.0704	0.1141	0.1520	0.1644	0.1510	0.1267	0.0835	0.0626	0.1197	0.1110	0.1128	0.0655	0.0239	0.0434	0.0628	0.0639	0.1046
R6	0.1982	0.1026	0.1053	0.0960	0.0192	0.0733	0.1086	0.0854	0.1174	0.0691	0.0922	0.0975	0.0812	0.1425	0.0850	0.0353	0.0682	0.0642	0.0896	0.0646	0.0838	0.0397	0.0872
R7	0.0270	0.0386	0.0388	0.0084	0.0375	0.0205	0.0304	0.0690	0.0404	0.0378	0.0175	0.0733	0.0744	0.0251	0.0129	0.0280	0.0417	0.0345	0.0094	0.0273	0.0232	0.0541	0.0350
R8	0.0135	0.0173	0.0115	0.0078	0.0159	0.0180	0.0092	0.0209	0.0212	0.0237	0.0208	0.0244	0.0247	0.0412	0.0304	0.0148	0.0531	0.0461	0.0229	0.0185	0.0289	0.0121	0.0226
R9	0.0542	0.0455	0.0255	0.1289	0.0385	0.0421	0.0508	0.0666	0.0674	0.0830	0.0827	0.1272	0.0866	0.0702	0.1170	0.0593	0.1004	0.0693	0.1309	0.0746	0.0774	0.0855	0.0765
R10	0.0542	0.0419	0.0534	0.0324	0.0311	0.0625	0.0474	0.0519	0.0478	0.0589	0.1509	0.0630	0.0639	0.1331	0.1126	0.0922	0.0641	0.0583	0.0275	0.0721	0.0683	0.0593	0.0658
R11	0.0961	0.0512	0.1043	0.0163	0.0308	0.0426	0.0931	0.0540	0.0436	0.0209	0.0535	0.1649	0.1317	0.0692	0.0264	0.1279	0.0727	0.0657	0.0684	0.0834	0.0710	0.0742	0.0710
R12	0.0333	0.0669	0.0256	0.0620	0.0187	0.0205	0.0113	0.0234	0.0145	0.0255	0.0089	0.0273	0.0509	0.0207	0.0639	0.0264	0.0371	0.0425	0.0412	0.0374	0.0581	0.0456	0.0346
R13	0.0414	0.0289	0.0383	0.0089	0.0224	0.0195	0.0088	0.0183	0.0168	0.0199	0.0088	0.0116	0.0216	0.0725	0.0219	0.0143	0.0464	0.0461	0.0214	0.0209	0.0340	0.0353	0.0263
R14	0.0111	0.0296	0.0256	0.0229	0.0370	0.0137	0.0323	0.0136	0.0256	0.0118	0.0206	0.0352	0.0079	0.0267	0.0762	0.0561	0.0489	0.0601	0.0708	0.0480	0.0405	0.0442	0.0345
R15	0.0148	0.0689	0.0524	0.0068	0.0199	0.0237	0.0647	0.0189	0.0158	0.0144	0.0559	0.0118	0.0543	0.0096	0.0275	0.1025	0.0383	0.0676	0.1272	0.0466	0.0285	0.0375	0.0413
R16	0.0244	0.0377	0.0336	0.0198	0.0246	0.0654	0.0342	0.0447	0.0358	0.0201	0.0132	0.0326	0.0477	0.0150	0.0085	0.0315	0.0257	0.0760	0.0791	0.0805	0.0242	0.0541	0.0376
R17	0.0635	0.0236	0.0296	0.0462	0.0227	0.0318	0.0216	0.0117	0.0198	0.0271	0.0218	0.0217	0.0137	0.0161	0.0212	0.0363	0.0296	0.0584	0.0309	0.0758	0.0727	0.0619	0.0344
R18	0.0073	0.0223	0.0093	0.0093	0.0167	0.0144	0.0111	0.0057	0.0122	0.0127	0.0102	0.0081	0.0059	0.0056	0.0051	0.0052	0.0064	0.0126	0.0682	0.0184	0.0481	0.0252	0.0155
R19	0.0695	0.1004	0.0261	0.0522	0.1277	0.0288	0.1132	0.0321	0.0181	0.0752	0.0275	0.0233	0.0354	0.0132	0.0076	0.0140	0.0336	0.0065	0.0352	0.0425	0.0682	0.0545	0.0457
R20	0.0194	0.0261	0.0204	0.0137	0.0376	0.0213	0.0210	0.0213	0.0170	0.0153	0.0121	0.0137	0.0194	0.0104	0.0111	0.0074	0.0073	0.0128	0.0155	0.0188	0.0076	0.0512	0.0182
R21	0.0310	0.0178	0.0296	0.0160	0.0254	0.0161	0.0241	0.0133	0.0160	0.0159	0.0139	0.0086	0.0117	0.0121	0.0178	0.0239	0.0075	0.0048	0.0095	0.0454	0.0184	0.0617	0.0200
R22	0.0122	0.0345	0.0169	0.0089	0.0160	0.0217	0.0066	0.0203	0.0093	0.0117	0.0085	0.0070	0.0072	0.0071	0.0086	0.0068	0.0056	0.0059	0.0076	0.0043	0.0035	0.0118	0.0110
Total																							1.0000

Table 4. Standardization Pair-wise Comparison Matrix for CRFs Affecting IT Projects in Malaysia

and the third significant within the top 6 is R6 refer as task-technology misfits with the priority vector 0.0872 or 8.7226 %. Afterwards, the R9 refer as change requests from diverse sources risk with 0.0765 or 7.6518 % of priority vector which followed by the R11 represented as uneven skill/ experiences among project members with the priority vector 0.0710 or 7.0994 % and the placed top sixth is R10 as the incompatibility of system/ network/ equipment CRFs with the priority vector 0.0658 or 6.5766%.

Coding (CRFs)	Prioritizing	Priority vector (%)
R5	1	10.4581
R2	2	9.8805
R6	3	8.7226
R9	4	7.6518
R11	5	7.0994
R10	6	6.5766
R19	7	4.5671
R1	8	4.2643
R15	9	4.1268
R3	10	3.9885
R16	11	3.7649
R4	12	3.6911
R7	13	3.5002
R12	14	3.4624
R14	15	3.4470
R17	16	3.4444
R13	17	2.6270
R8	18	2.2598
R21	19	2.0024
R20	20	1.8193
R18	21	1.5457
R22	22	1.1002

Table 5. Prioritizing of CRFs Affecting IT Projects in Malaysia with Sorting

Figure 1 shows the histogram of priority vector of the critical risk factors affecting IT projects. Each priority vector for critical risk factors are arranging from the most importance to the least important that show in the Figure 1. Based on the histogram, R5 with the highest priority vector that located in the first bar and R22 with the least priority vector that located in the last bar of the histogram. Besides that, there are a significantly gap between the first bar (R5) and the sixth bar (R19) which from priority vector 0.1046 to 0.0457 respectively. Moreover, there are also a gap between R17 and R13 which from priority vector as 0.0344 to 0.0263 respectively. Whereas, the remaining of the critical risk factors with the priority vectors are increase gradually throughout the histogram chart. The finding also show that the top 6 critical risk factors included task distribution and resources coordination (R5), lack of communication (R2), task- technology misfits (R6), change request from diverse sources (R9), uneven skill/ experiences among project members (R11) and incompatibility of system/network/equipment (R10) with the priority vector are 0.1046, 0.0988, 0.0872, 0.0765, 0.0710, and 0.0658 respectively.

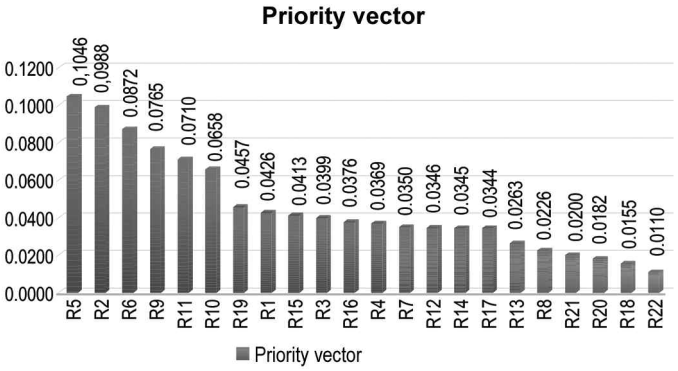


Figure 1. Priority Vector for Critical Risk Factors Affecting IT Projects in Malaysia

In this study, the researcher believes that both objective have been responded and completed at the same time to provide a positive direction for IT companies. The finding shows that task distribution and resource coordination (R5; Top 1)) is the most important critical risk factors as the priority vector is 0.1046 or 10.4581 %. This CRFs with the highest numbers of priority vectors which claimed and propose by the journal article such as Jiang & Klein (200), Schmidt et al (2001), Fairly (2005), Sakthivel (2005), Kotlarsky et al. (2007), Nakatsu & Iacovou

(2009), and Alfaadel et al (2012). Moreover, the findings also stated that the R5 is the most significant CRFs which often faced in the IT projects where the private sector (IT companies) must aware and mitigate itself in implement IT projects. Moreover, the lack of communication (R2; Top 2) with the priority vector 0.0988 or 9.8805 % which is involved different parties in implement an IT project where is hard to convert the same massages for all parties (Hongyan, 2010; Kerzner, 2009). The lack of communication can influence the client express their requirement and expectation to the project team towards the project. Therefore, the communications an essential element that need to be concern by the project manager during the whole project life cycle for ensure there are not any misunderstanding and miscommunication. Furthermore, the task-technology misfits (R6; Top 3) with the priority vector 0.0872 or 8.7226 % where proclaim by Avdoshin et al. (2012), Espinosa et al. (2007), Goodhue & Thompson, (1995) and Powell et al. (2004). This risk affected the task and the applied technologies mismatch when go thru an integrate process where have a significant influence on the IT project. There is a fatal aspect led IT project under a risk circumstance where project manager was difficult to response the risk in a quick time for reduce the loss.

On the other hand, the change request from diverse sources (R9; Top 4) with the priority vector 0.0765 or 7.6518 % proposed by the Chua (2009) and Lee et al. (2015) indicated that the project team fail to control change and tracked the change consistency where it led to confusion in project team. The change request should be recorded and notified to all parties involved in the IT project for establish a proper change management for tracking the changing. In additional, Avdoshin (2011) and Lee (2015) proposed that the uneven skill or experience project members (R11) CRFs with the priority vectors 0.0710 or 7.0994 % which typical arises in the implementation where the project manager is essential to define a standard skill requirement according the project demand for reduce the insufficiency in skill and knowledge in project team. Not only define a standard requirement, project manager is necessary to provide relevant training for the project team according to what type of IT project implemented. The incompatibility of system/ network/ equipment (R10; Top 6) with the priority vector 0.0658 or 6.5766 % proposed by Ahlan & Arshad (2012), Baccarini et al. (2004), Nakatsu & Iacovou, 2009 and Lee et al. (2015). The incompatible of system led IT projects under slow progress in operational process where cause the progress out of what were planned before implement the IT projects. In some way, the project manager was suffered the influences of the poor internet network for running the programming for the IT projects. This finding is typically supported by the previous research studies and the literature review in the study which proclaim to be effective due to the frequently supported by different researchers in relevant field.

5. Conclusion

This study is quite different from the previous research studies are typically focusing on the critical success factors of information system and software development that faced by the IT industries in other countries. This study has been focussed to identify the list of critical risk factors and prioritize the main critical risk factors affecting IT project in Malaysia. The findings of this study show that that the task distribution and resource coordination (Top1), lack of communication (Top 2), task technology misfits (Top 3), change request from diverse sources (Top 4), uneven skills/ experiences among project members (Top 5), and lack of user competency/ commitment/ involvement (Top 6) were the critical risk factors that affecting IT projects in Malaysia. Unfortunately, the task distribution and resource coordination are the main critical risk factors affecting IT projects where it should be aware and mitigate by the company during executing IT projects. On the other hand, the researcher has obtained the list of critical risk factors through different literature review from different countries where is faced by the information technology field to formulate a priority framework as a reference for future research. Therefore, the best way to maintain information projects on the safe side is to put the project in a minimum risk as much as possible which the IT projects are essential concern the right resources and effective risk management plan in implement IT projects.

The researcher also believe that other factors may be more important of an IT projects than the critical risk factors as suggested in this study, but for various factors it cannot be determined in previous studies. The recommendation for the future study is to obtain more critical risk factors affecting IT projects through a broader reviewing on other relevant studies and journal to accessing and identifying a more critical list of risk factor in IT projects. In addition, the researchers recommend that more experts (respondents) should be included and covered in future research. Rather than just focusing on experts on private sectors (IT companies), whereas the government sectors or ministry should be involved to ensure the reliability and effectiveness of the results. On the other hand, there are many research used hypothesis testing as methodology for analysis the finding in the previous studies where the researcher recommends and encourage can apply pairwise comparison in the future study.

References

[1] Ahlan, A. R., & Arshad, Y. (2012). Information Technology Risk Management: The case of the International Islamic University Malaysia. *Journal of Research and Innovation in Information Systems*, (June 2014), 58–67.

[2] Alam, M. N., Jebran, J. K., & Hossain, M. A. (2012). Analytical Hierarchy Process (AHP) Approach on Consumers' Preferences for Selecting Telecom Operators in Bangladesh. *Information and Knowledge Management*, 2(4), 7–18.

[3] Alfaadel, F., Alawairdhi, M., & Al-Zyoud, M. (2012). Success and Failure of IT Projects: A Study in Saudi Arabia. In *Proceedings of the 11th WSEAS* (pp. 77–82).

[4] Avdoshin, S. M., & Pesotskaya, E. Y. (2011). Software risk management. *2011 7th Central and Eastern European Software Engineering Conference*, *CEE-SECR 2011*, 1–6.

[5] Avdoshin, S. M., & Pesotskaya, E. Y. (2012). Software risk management: Using the automated tools. In *CEUR Workshop Proceedings* (Vol. 963, pp. 32–43).

[6] Baccarini, D., Salm, G., & Love, P. E. D. (2004). Management of risks in information technology projects. *Industrial Management & Data Systems*, 104(4), 286–295.

[7] Bai, Y., Dai, Z., & Zhu, W. (2014). Multiphase Risk-Management Method and Its Application in Tunnel Engineering. *Natural Hazards Review*, 15(2), 140–149.

[8] Bailey, M., & Riffel, M. (2010). Understanding and Mitigating IT Project Risks. *Government Finance Review*, June, 30–35.

[9] Battin, R. D., Crocker, R., Kreidler, J., & Subramanian, K. (2001). Leveraging resources in global software development. *IEEE Software*, 18(2), 70–77.

[10] Boehm, B. W. (1991). Software Risk Management: Principles and Practices. *IEEE Software*, 8(1), 32–41.

[11] British Malaysia Chamber of Commerce Berhad, B. (2017). *Information & Communications Technology Sector* 2017 / 2018. Retrieved from http://www.bmcc.org.my/vault/publications/ict-sector-report-2017-2018

[12] Chadli, S. Y., Idri, A., Fernandez-Aleman, J. L., Ros, J. N., & Toval, A. (2016). Identifying risks of software project management in Global Software Development: An integrative framework. In *2016 IEEE/ACS 13th International Conference of Computer Systems and Applications* (*AICCSA*) (pp. 1–7).

[13] Chua, A. Y. K. (2009). Exhuming It Projects From Their Graves: an Analysis of Eight Failure Cases and Their Risk Factors. *Journal of Computer Information Systems*, 49(3), 31–39.

[14] Cusumano, M. A. (2008). Managing Software Development in Globally Distributed Teams. *Communications of the ACM*, 51(2), 15–17.

[15] Dave, O. (2018). Can the DMV mess get any worse? Actually, it can – this week, IT leaders say. *TwinCities Pioneer Press*.

Retrieved from https://www.twincities.com/2018/02/27/mn-dmv-mnlars-mess-it-needs-10-mil-by-thursday-or-layoffs/
[16] Dunn, S. C. (2001). Motivation by project and functional managers in matrix organizations. *EMJ - Engineering Management Journal*, 13(2), 3–10.
[17] Espinosa, J. A., Slaughter, S. A., Kraut, R. E., & Herbsleb, J. D. (2007). Team Knowledge and Coordination in Geographically Distributed Software Development. *Journal of Management Information Systems*, 24(1), 135–169.
[18] Eusoff, N. S. (2018, January). Malaysia IT spending to grow 5.7% this year to RM65.2b, says gartner. *The Edge Markets*. Retrieved from http://www.theedgemarkets.com/article/malaysia-it-spending-grow-57-year-rm652b-says-gartner
[19] Ezamly, A., & Hussin, B. (2011). Estimating Quality-Affecting Risks in Software Projects. *International Management Review*, 7(2), 66–75.
[20] Fairley, R. E. (2005). Software Risk Management. *IEEE Software*, 22(3), 101.
[21] Fowler, J. J., & Horan, P. (2007). Are information systems success and failure factors related? An exploratory study. *Journal of Organizational and End User Computing*, 19(2), 1–22.
[22] Giuseppe, G. (2017). Connection Project 2017. *Gofundme*. Retrieved from https://www.gofundme.com/ConnectionProject2017
[23] Goodhue, D. L., & Thompson, R. L. (1995). Task-Technology Fit and Individual Performance. *MIS Quarterly*, 19(2), 213.
[24] Hamed, T. (2017). Decision Making Using the Analytic Hierarchy Process (AHP); A Step by Step Approach. *International Journal of Economic and Management Syatem*, 2(January 2017), 244–246.
[25] Harrin, E. (2015). *Why are IT projects different?* Retrieved from http://www.esi-intl.co.uk/blogs/pmoperspectives/index.php/projects-different/
[26] Herbsleb, J. D., & Moitra, D. (2001). Global software development. *IEEE Software*, 18(2), 16–20.
[27] Hongyan, L. (2010). The Analysis of Project Risk Management Based on AHP. *2010 2Nd Ieee International Conference on Information and Financial Engineering* (*ICIFE*), 576–579.
[28] Hui, A. K. T., & Liu, D. B. (2004). A Bayesian belief network model and tool to evaluate risk and impact in software development projects. *Annual Reliability and Maintainability Symposium, 2004 Proceedings*, (February 2000), 297–301.
[29] Jiang, J., & Klein, G. (2000). Software development risks to project effectiveness. *Journal of Systems and Software*, 52(1), 3–10.
[30] Karlyn, M. R. O. & M. A. (2015). *Reducing Security Risks in Information Technology Contracts: Best Practices and Guiding Principles*. Retrieved from http://www.ittoday.info/ITPerformanceImprovement/Articles/2015-07Overly.html
[31] Keil, M., Cule, P. E., Lyytinen, K., & Schmidt, R. C. (1998). A framework for identifying software project risks. *Communications of the ACM*, 41(11), 76–83.
[32] Kerzner, H. (2009). *Project management: a systems approach to planning, scheduling, and controlling*. New York.
[33] Kevin Mason. (2006). *Identifying software development project risks. What you dont know will hurt you*.pdf.
[34] Koczkodaj, W. W., & Urban, R. (2018). Axiomatization of inconsistency indicators for pairwise comparisons. *International Journal of Approximate Reasoning*, 94, 18–29.
[35] Kotlarsky, J., Oshri, I., Van Hillegersberg, J., & Kumar, K. (2007). Globally distributed component-based software development: An exploratory study of knowledge management and work division. *Journal of Information Technology*, 22(2), 161–173.
[36] Lee, O.-K. (Daniel), Banerjee, P., Lim, K. H., Kumar, K., Hillegersberg, J. van, & Wei, K. K. (2006). Aligning IT components to achieve agility in globally distributed system development. *Communications of the ACM*, 49(10), 48.
[37] Levina, N., & Vaast, E. (2008). Innovating or doing as told? Status differences and overlapping boundaries in offshore collaboration. *MIS Quarterly*, 32(2), 307–332.
[38] Lisa, S. (2017). Project Management Performance, Success, Failure, Risk and Recovery and Management. *Info-Teq*. Retrieved from http://www.info-teq.com/project-management-performance-success-failure-risk-and-recovery-and-management/
[39] Liu, S., & Wang, L. (2014). Understanding the impact of risks on performance in internal and outsourced information technology projects: The role of strategic importance. *International Journal of Project Management*, 32(8), 1494–1510.
[40] Liu, S., Zhang, J., Keil, M., & Chen, T. (2010). Comparing senior executive and project manager perceptions of IT project risk: A Chinese Delphi study. *Information Systems Journal*, 20(4), 319–355.
[41] Moore, S. (2016). Information Technology. *Tech Target*. Retrieved from http://www.gartner.com/it-glossary/it-information-technology
[42] Morris, P. W. G. (1999). Why projects fail. *IEE Colloquium. Risk Management in Engineering Projects*, 1999, 1–1.
[43] Nakatsu, R. T., & Iacovou, C. L. (2009). A comparative study of important risk factors involved in offshore and domestic outsourcing of software development projects: A two-panel Delphi study. *Information and Management*, 46(1), 57–68.
[44] Nelson, R. R., & Cheney, P. H. (1987). Training End Users: An Exploratory Study. *MIS Quarterly*, 11(4), 547.
[45] Niu, J. (2009). Overcoming inadequate documentation. In *Proceedings of the ASIST Annual Meeting* (Vol. 46).
[46] One-Ki (Daniel) Lee, Blake, R., & Baby, D. V. (2015). A Framework of Risk in Global IT Projects and Mitigation Strategies from Service-Oriented Architecture. *IGI Global*, 200–220.
[47] PMI. (2014). Requirements Management: A Core Competency for Project and Program Success. *PMI's Pulse of the Profession*, 1–20.
[48] Poolsappasit, N., Dewri, R., & Ray, I. (2012). Dynamic security risk management using Bayesian attack graphs. *IEEE Transactions on Dependable and Secure Computing*, 9(1), 61–74.
[49] Powell, A., Piccoli, G., & Ives, B. (2004). Virtual teams: A Review of Current Literature and Directions for Future Research. *ACM SIGMIS Database*, 35(1), 6–36.
[50] Project Management Institute, I. (PMI). (2013). 1 Introduction. *A Guide to the Project Management Body of Knowledge* (*PMBOK GUIDE*), 1–18.
[51] Project Management Institute Inc. (2000). *A guide to the project management body of knowledge* (*PMBOK® guide*). Book.
[52] Richard Eiser, J., Bostrom, A., Burton, I., Johnston, D. M., McClure, J., Paton, D., … White, M. P. (2012). Risk interpretation and action: A conceptual framework for responses to natural hazards. *International Journal of Disaster Risk Reduction*, 1(1), 5–16.
[53] Ropponen, J., & Lyytinen, K. (2000). Components of software development risk: how to address them? A project manager survey. *IEEE Transactions on Software Engineering*, 26(2), 98–112.
[54] Saaty, T. L. (2008). Decision making with the analytic hierarchy process. *International Journal of Services Sciences*, 1(1), 83.
[55] Sakthivel, S. (2005). Virtual workgroups in offshore systems development. *Information and Software Technology*.
[56] Sarker, S., & Sahay, S. (2004). Implications of space and time for distributed work: An interpretive study of US-Norwegian systems development teams. *European Journal of Information Systems*, 13(1), 3–20.
[57] Schmidt, R., Lyytinen, K., Keil, M., & Cule, P. (2001). Identifying software project risks. *Journal of Management Information Systems*, 17(4), 5–36.
[58] Sharma, Arpita, Gupta, Aayushi and Khilnani, D. (2008). Identification and Ranking of Software Project Risks. *Asia-Pasific Business Review*, IV(2), 116–122.
[59] Spacey, J. (2015). *77 Type of information technology*. Retrieved from https://simplicable.com/new/types-of-information-technology
[60] Stewart, D. B. (1999). Twenty-Five Most Common Mistakes with Real-Time Software Development. *1999 Embedded Systems Conference*, (September), 1–13.
[61] Taylor, H., Artman, E., & Woelfer, J. P. (2012). Information technology project risk management: Bridging the gap between research and practice. *Journal of Information Technology*, 27(1), 17–34.
[62] Tesch, D., Kloppenborg, T. J., & Frolick, M. N. (2007). IT Project risk factors: The project management professionals perspective. *Journal of Computer Information Systems*, 47(4), 61–70.
[63] Wallace, L., Keil, M., & Rai, A. (2004). Understanding software project risk: A cluster analysis. *Information and Management*, 42(1), 115–125.
[64] Zuo, F., & Zhang, K. (2018). Selection of risk response actions with consideration of secondary risks. *International Journal of Project Management*, 36(2), 241–254.
[65] Zwikael, O., & Globerson, S. (2006). From Critical Success Factors to Critical Success Processes. *International Journal of Production Research*, 44(17), 3433–3449.

Breast Cancer in Healthcare Shift- and Night-Workers – Preliminary Results of a Case Control Study and Risk Management

Veronica TRAVERSINI[1], Luigi Isaia LECCA[1*], Maria BANCHI[2], Alessandro MARINACCIO[3], Chiara BURCHI[2], Elisabetta CHELLINI[2]

[1]Department of Experimental and Clinical Medicine, University of Florence, Florence, Italy
[2]Unit of Environmental and Occupational Epidemiology, Institute of Cancer Research, Prevention and Clinical Network, Florence, Italy
[3]Occupational and Environmental Medicine, Epidemiology and Hygiene Department, Italian Workers' Compensation Authority (INAIL), Roma, Italy
[*]Corresponding author: Luigi Isaia Lecca, MD, Department of Experimental and Clinical Medicine, University of Florence; Address: Largo Piero Palagi 1, 50139, Florence, Italy; E-mail: luigiisaia.lecca@unifi.it

Abstract

Shift work, in particular the night shift, has a significant impact on health, especially increasing the onset of digestive, cardiovascular and oncological pathologies. In 2019, IARC confirmed the shift and night work as a probable carcinogen for humans (Group 2A), due to its association with breast cancer. Mechanisms involved are genetic predisposition, de-synchronization of circadian rhythms due to sleep losses with alterations in the cell cycle' regulation and immunological deficiencies. Nevertheless, epidemiological evidences are still limited. The purpose of this case-control study was to estimate breast cancer risk due to night shift work in health settings also considering some possible confounders such as personal and organizational factors. Data were collected by a dedicated questionnaire investigating shift work exposure, along with other personal risk factors for breast cancer. Overall 433 subjects (79 cases and 354 controls) were recruited from two large health settings in central Italy. The preliminary results showed an increased risk of developing breast cancer in female workers who have used oral contraceptives for a period from 5 to 20 years, compared to the subpopulation that does not use it (OR 2.70, IC 95% 1.21 – 6.01). No significant association was found with shift work exposure. The prolonged use of oral contraceptives as birth control method could have relevant health and organizational implications in health care settings. Further efforts are warranted to clarify the role shift work and contraceptive use on the development of breast cancer.

Keywords: *shift work; breast cancer; healthcare workers; preventive medicine; organizational factors.*

1. Introduction

In June 2019, IARC confirmed the previous 2007 classification of Shift and Night Work, placing this risk in Group 2A, as a probable carcinogen for humans, due to correlation with the development of certain cancers. In particular, the IARC working group concluded that there was sufficient evidence for breast, particularly among premenopausal workers, prostate and colorectal cancer, based on sufficient evidence in animal experiments and limited evidence in epidemiological studies (IARC, 2019; Salamanca-Fernandez et al., 2018). Associations were more evident in cases of high-intensity and long-lasting night shifts (IARC, 2019).

Shiftwork, in particular the night shift, has a significant impact on many aspects of a worker's life. According to several authors, this work organization can interfere on four main aspects: 1) on biological structure (changes in sleep/wake rhythm disrupt the normal circadian rhythmicity of biological functions and psychophysical conditions), 2) on work capacity, due to fluctuations in performance over 24 hours with a greater likelihood of accidents (Kecklund and Axelsson, 2018), 3) on health, especially consequent sleep disorders, digestive (Jung and Lee, 2016), anxiety, irritability, autonomic cardiac deregulation (Lecca et al, 2019) and oncological pathologies (Liu et al., 2018), 4) social context, with negative interference in family life (Costa, 2015a). In particular, it is found that women employed on night shifts have more frequent menstrual irregularities with dysmenorrhea, reduced fertility, increased miscarriages, pre-term births and low birth weight of the child (Nurminem, 1998; Mozurkewich et al., 2000; Lim et al 2016).

About the development of tumors, the pathophysiological mechanisms linked to circadian desynchronization involving carcinogens are various (Shi et al., 2020;Bhatti et al., 2014); for example, for breast cancer, the researchers argue that, in the case of genetic predisposition or not, repeated sleep losses resulting in de-synchronization of circadian rhythms lead to alterations in the cell cycle' regulation with effects on estrogen-sensitive breast cells, in addiction to immunological deficiencies (Costa G, 2010a; Erren et al., 2019; Bracci et al, 2019).

The latest European surveys showed that only 27% of employees and 8% of self-employed people work in daily hours, for example from Monday to Friday between 7am and 5pm. Most workers are employed in non-traditional hours, including shiftwork, night shifts, weekends, part-time, telework, on-call or on extended flexible hours (Costa, 2010b).

Such a scenario must be considered also in the light of the "future of work". Organization are deeply changing by both the development of new skills and the growth of opportunities, but not all the workforce is ready to face these changes (Giorgi et al., 2019)

According to Eurostat sources, the percentage of Italian workers employed at atypical hours stands at 41.8% compared

to 38.5% of the EU average. Another aspect that characterizes our country is the high percentage of weekend workers (32.7% compared to 26.6% of the European average), a group composed mainly of self-employed (59.4% in the 25-49 age group compared to 35% of employees). In the case of night work, Italy ranks 2nd after Germany; in fact, in the same age group, 8.7% of workers are employed as night shifts, compared with 9.7% in Germany and 6.4% of the EU average (Costa, 2015b).

These data show that in recent decades the organization of shiftwork has been extended to ensure essential services such as transport, hospitals, telecommunications, but also to increase the productivity of industrial and commercial sectors.

The case-control study presented here on incidence of breast cancer involves health workers, an area in which many female workers have provided and continue to serve in the facilities hospitals at night. This study is part of the "Study of known and emerging risk factors for the detection and prevention of professional cancers" project, funded by INAIL as part of the BRIC 2016 call and aims to contribute to identifying the risk estimation of the breast cancer, caused by shift and night work in the health sector.

2. Materials and Methods

2.1. Study Design

A hospital-based study was performed to estimate breast cancer risk due to nigh shift work in health settings. An expert panel was primary called upon to assess the study procedure and the evaluation tools. Then, the same panel assessed the enrollment procedure to identify shift work related cases in health settings, starting from the available scientific data. In this phase, a dedicated questionnaire was set up to be used during prevention activity and health surveillance in hospitals. Moreover, the same questionnaire allows to identify the occupational burden of disease, when used by the insurance agency.

2.2. Study Population

The study population enrolled in the study was the female workforce belonging to two large public health services form Central Italy, called “AOU Careggi” and “AOU Pisana”, and in work activity between years 1997 and 2016.

To identify the breast cancer cases, we screened the hospital admissions in the same services where they have worked. Selection criteria were:

i) women affected by breast cancer;
ii) to be hospitalized for breast cancer treatment in period from 1997 to 2016 in the same health service where they have worked for;
iii) to have worked in the period 1997 – 2016 in the health service where they have been hospitalized (AOU Careggi or AOU Pisana).

We considered as reasonable that female health personnel chooses to treat himself in the same health service where they had worked for. However, we plan to validate this assumption by controlling for the regional discharge forms.

Considering the good survival rates for this disease (about 85% after 5 years from diagnosis), an estimated incidence of 152 cases every 1000 women (AIRTUM data), and an overall workforce of 4500 female workers, we estimated to identify at least 136 breast cancer cases and to enroll 3 controls for each identified case, to reach an OR of 1.2 – 1.5, a power of 0.80 and a significance level of 0.05.

Controls (3 controls for each case) were randomly selected from the same study population, following those selection criteria:

i) matched for age (+-2 years) with the case
ii) to work in the same health service with respect to the case.

In particular, cases and controls were collected by the dataset for the linkage with the discharge forms composed by 10566 female health workers, of which 5664 from AOU Careggi (AOUC) and 4903 from AOU Pisana (AOUP). Both the databases were controlled by the expert panel, to ensure data quality, making comparisons with regional Tuscany dataset of enrolled patients.

Overall, 218 hospitalized cases were identified, of which 81 from AOUC and 137 from AOUP. Less than 45% of them were already on the job. Controls identified were 654, of which 243 from AOUC and 411 from AOUP. Controls already on the job accounted for the 43%.

All the cases and controls were invited to participate in the study trough a letter invitation and an information about the study protocol and objectives. If respondents were died, the letter was sent to a proxy who lives in the same city. All persons who denied participating in the study and denied consent to participation in the study were excluded.

The study participation consisted by the willingness to respond to a questionnaire administered by trained health personnel (a physician or a health care aides).

The questionnaire allows to collect data about shift work and night work activity, along with other known risk factors for breast cancer such as age, educational level, BMI, alcohol assumption, smoking habit, oral contraceptive assumption, pregnancy, number of child, menopause age, familiarity for breast cancer and hormonal therapy.

2.3. Statistical analysis

All the collected data were anonymized and stored in a unique database to conduct statistical analysis. Estimated risk were stratified for duration of employment in shift work and night work, job tasks (physicians, nurses, technicians) and adjusted for possible confounders. The association between the variable of interest and the onset of breast cancer were evaluated by multivariate logistic regression analysis, also taking into consideration the role of possible confounders. The Odds Ratios (ORs) and their 95% confidence interval were calculated.

The study protocol was revised by an expert panel and approved by two independent Local Ethical Committees (for the Tuscan central area and for the AUOP area of competence).

3. Results

Of the 782 potentially recruitable subjects (218 cases and 564 controls identified), a total of 433 subjects (79 cases and 354 controls) were recruited by interview on which the breast cancer incidence analysis was conducted.

	Careggi (Florence)	Pisa	Total
Healthcare workers 1997-2016	5.664	4.902	10.566
CASES			
in service	45	56	101
not in service	36	81	117
total	81	137	218
CONTROLS			
in service	100	183	283
not in service	143	228	371
total	243	411	654

Table 1.
Sample of the study stratified or cases, controls and university hospital of origin

		CASES		CONTROLS	
		n.	%	n.	%
Hospital	Careggi (Florence)	32	40.5	147	41.5
	Pisa (PI)	47	59.5	207	58.5
	Total	79	100.0	354	100.0
Occupation	Nurses	44	55.7	206	58.19
	Physicians	16	20.25	43	12.15
	Other	19	24.05	105	29.66
	Total	79	100	354	100
Age at the interview (2019)	35-44	2	2.53	6	1.69
	45-54	28	35.44	101	28.53
	55-64	37	46.84	150	42.37
	>=65	12	15.19	97	27.4
	Total	79	100	354	100
BMI	Under weight	1	1.27	3,67	3.67
	Normal weight	40	50.63	206	58.19
	Overweight	18	22.78	89	25.14
	Obese	5	6.33	43	12.15
	N.r.	15	18.99	3	0.85
	Total	79	100	354	100
Education Level	Elementary license	0	0	4	1.13
	Middle schools	2	2.53	48	13.56
	High school diploma	14	17.72	91	25.71
	Bachelor's degree or degree	34	43.04	120	33.9
	Other	28	35.44	84	23.73
	N.n.	1	1.27	7	1.98
	Total	79	100	354	100

Table 2. Characteristics of the recruited population (N. 433)

Tables 3, 4 and 5 show the characteristics of the population studied, in terms of the prevalence of different risk factors (or protective factors) for the onset of breast cancer. In particular, Table 3 presents data on smoking habit (active and passive), body mass index, alcohol consumption and physical activity, stratified by job (nurses, physicians and other tasks). The characteristics related to hormonal cycles and sleep are shown in Table 4 and 5, respectively.

			CASES			CONTROLS		
			nurses	**physicians**	**other**	**nurses**	**physicians**	**other**
Physical Activity	no	n.	15	5	6	72	8	34
		%	34.09	31.25	31.58	34.95	18.6	32.38
	yes	n.	29	11	13	134	35	71
		%	65.91	68.75	68.42	65.05	81.4	67.62
	Total	n.	44	16	19	206	43	105
		%	100	100	100	100	100	100
Alcohol consumption	no	n.	34	11	13	175	33	80
		%	77.27	68.75	68.42	84.95	76.74	76.19
	yes	n.	10	5	6	31	10	25
		%	22.73	31.25	31.58	15.05	23.26	23.81
	Total	n.	44	16	19	206	43	105
		%	100	100	100	100	100	100
Smoke	Never	n.	17	6	9	57	20	40
		%	38.64	37.5	47.37	27.67	46.51	38.1
	Current	n.	7	4	4	63	7	20
		%	15.91	25	21.05	30.58	16.28	19.05
	Past	n.	16	5	5	75	12	42
		%	36.36	31.25	26.32	36.41	27.91	40
	N.n.	n.	4	1	1	11	4	3
		%	9.09	6.25	5.26	5.34	9.3	2.86
	Total	n.	44	16	19	206	43	105
		%	100	100	100	100	100	100
Passive smoking exposure	no	n.	18	9	7	93	24	51
		%	40.91	56.25	36.84	45.15	55.81	48.57
	yes	n.	26	7	12	113	19	54
		%	59.09	43.75	63.16	54.85	44.19	51.43
	Total	n.	44	16	19	206	43	105
		%	100	100	100	100	100	100

Table 3. Other characteristics of healthcare workers interviewed for job

		CASES		CONTROLS	
		n.	%	n.	%
Menarch	<=10	11	13.92	34	9.6
	>10,<=15	65	82.28	312	88.14
	>15	3	3.8	7	1.98
	n.n.	0	0	1	0.28
Contraceptive use	no	29	36.71	121	34.18
	yes	50	63.29	233	65.82
Contraceptive use time (years)	<5	18	36	111	47.64
	5-->10	14	28	32	13.73
	10-->20	14	28	37	15.88
	>=20	2	4	21	9.01
	n.n.	2	4	32	13.73
Type of contraceptives	Progestin	4	8	22	9.44
	Estro-progestogen	40	80	90	38.63
	Other	2	4	50	21.46
	n.n.	4	8	71	30.47
Term pregnancies	0	1	1.27	13	3.67
	1 or more	62	78.48	272	76.84
	n.n.	16	20.25	69	19.49
Abortion	0	16	20.25	44	12.43
	1 or more	33	41.77	101	28.53
	n.n.	30	37.97	209	59.04
Breastfeeding		49	79.03	206	75.74
Hormone therapy for assisted fertilization		5	6.33	15	4.24
Menopause		64	81.01	275	77.68
Type of menopause	Physiological	31	48.44	251	91.27
	Surgical	2	3.13	12	4.36
	Pharmacological	31	48.44	11	4
	n.n.	0	0	1	0.36
Hormone therapy for menopause		7	10.94	53	19.27
Age at menopause	average	47.05		50.04	
	range	36-56		24-62	

Table 4. Characteristics related to the hormonal history of the healthcare workers interviewed

		CASES		CONTROLS	
		n.	%	n.	%
Sleep type	Early	29	36.71	128	36.16
	Delayed	20	25.32	104	29.38
	Flexible	30	37.97	112	31.64
	n.n.	0	0	10	2.82
Sleep disorders		29	36.71	153	43.22
Drug use		9	31.03	63	41.18

Table 5. Sleep-related characteristics of the healthcare workers interviewed

Finally, Table 6 shows the adjusted risk estimates for the variables considered: there is an excess of risk for using oral contraceptives for a period of use from 5 to 20 years, compared to the subpopulation that does not use contraceptives. There was also an excess of risk at the limits of significance (OR 2.06, IC 95% – 0.97 – 4.37) for the physicians compared to other jobs. The excess risk for exposure to night shifts compared to non-shift workers is not significant.

4. Discussion

The preliminary results of the present case control study, to investigate the effect of the night shift work on the onset of breast cancer in a study population of healthcare workers, highlighted a relevant excess of risk attributable to the continuative assumption of oral contraceptives, with respect to the subpopulation who did not use such drugs. On the other hand, the results did not show any significant effect of the night shift work on increasing risk of breast cancer. The results of the present

		OR	CI 95% min	CI 95% max
Lenght of night work (years)	0	1		
	1-10	1.13	0.47	2.73
	>=10,<20	1.48	0.64	3.42
	>=20	1.30	0.58	2.95
Age at interview	45-54	1		
	35-44	1.20	0.23	6.29
	55-64	0.89	0.51	1.54
	>=65	0.45	0.21	0.93
Alcohol consumption	No	1		
	Yes	1.58	0.90	2.78
Smoking	No	1		
	Current	0.61	0.31	1.19
	Past	0.74	0.41	1.31
Passive smoke	No	1		
	Yes	1.19	0.73	1.95
Physical activity	No	1		
	Yes	0.96	0.57	1.61
Oral contraceptives (Use in years)	No	1		
	5-10	**2.70**	**1.21**	**6.01**
	10-20	**2.33**	**1.06**	**5.15**
	>=20	0.59	0.13	2.72
Sleep disorders	No	1		
	Yes	0.76	0.46	1.26
Occupation	Other	1		
	Nurses	1.18	0.66	2.12
	Physicians	2.06	0.97	4.37

Table 6. Breast Cancer Risk Estimates

study confirmed only partially preview scientific literature. In particular, other scientific reports reported the role of the oral contraceptive assumption on the development of breast cancer (Wahidin et al., 2018; Bardaweel et al., 2019; Morch et al., 2017).

In the examined population, over 65% of women declared the assumption of oral contraceptives and between them over 60% referred a prolonged use more than 5 years. The prolonged use of oral contraceptives as birth control appear an aspect of interest in the health sector, with possible consequences in term of increasing risk of breast cancer. This aspect raises relevant questions at an organizational level and calls for reflection about the efficacy of support for motherhood policies (Coughlin and Smith, 2015). Therefore, it would be appropriate to implement such policies with targeted actions aimed to improve the work-family balance. This can be of special interest in a work sector where female working population tend to use oral contraceptives as a birth control method.

A concomitant exposure to known risk factors for breast cancer, such as prolonged oral contraceptives assumption and the night shift work, could determine a synergic effect in a working population typically exposed to both these risk factors, such the health care personnel (Rosa et al., 2019). Further efforts in this direction could confirm this hypothesis.

Some limitations affect the present study, such as a smaller sample size than estimated, a not balanced distribution of the study population between the two health services considered, a lack of evaluation of some possible synergic effects and precise definition of shift work modality.

Despite those limitations, our results appear in line with previous scientific reports about an attributable risk for the prolonged use of oral contraceptives, while, on the other hand, they are not conclusive about a supposed risk attributable to night shift work exposure. This not confirmed association between night shift work and breast cancer may be due to the small simple size, less than that estimated, or to a not precise assessment of the shift work modality. In particular, this issue demonstrated a relevant importance to point out an excess of risk, as reported in previous scientific articles (Ijaz et al., 2013; Wegrzyn et al., 2017). Moreover, the examined population were mainly composed by subject in perimenopausal or postmenopausal age. This aspect should be taken into consideration in the light of recent scientific evidences reporting an absence of excess risk linked to a night shift exposure in postmenopausal age (Cordina-Duverger et al., 2018; Stock et al., 2019).

5. Conclusions

In conclusion, our results are not conclusive to attribute an excess risk of breast cancer due to night shift work exposure, while an association with the prolonged assumption of oral contraceptives is confirmed. Further studies with a larger simple size and a more precise definition of the shift work modality are warranted to better assess an excess of risk attributable to different risk factors, also considering some possible synergic effects, such as that suggested between night shift work and oral contraceptive assumption. Finally, the questionnaire tool used to assess personal and work-related risk factors could be used by occupational physicians in the health surveillance for healthcare staff employed in hospitals and engaged in night shift work.

Acknowledgments

Veronica Traversini and Luigi Isaia Lecca have equally contributed to the production of this manuscript.

The authors are especially thankful to the Expert Panel for its support in the study conduction.

References

[1] Bardaweel SK, Akour AA, Al-Muhaissen S (2019). Oral contraceptive and breast cancer: do benefits outweigh the risks? A case – control study from Jordan; *BMC Women's Health*; 19, 72; doi:10.1186/s12905-019-0770-x.

[2] Bassuk SS, Manson JE (2015). Oral contraceptives and menopausal hormone therapy: relative and attributable risks of cardiovascular disease, cancer, and other health outcomes. *Ann Epidemiol*., 25(3): 193-200. doi: 10.1016/j.annepidem.2014.11.004.

[3] Bhatti P, Mirick DK, Davis S (2014). The impact of chronotype on melatonin levels among shift workers; *Occup Environ Med*; 71(3): 195-200; doi: 10.1136/oemed-2013-101730.

[4] Bhupathiraju SN, Grodstein F, Stampfer MJ, Willett WC, Hu FB, Manson JE (2016). Exogenous Hormone Use: Oral Contraceptives, Postmenopausal Hormone Therapy, and Health Outcomes in the Nurses' Health Study. *Am J Public Health*. 106(9): 1631-1637; doi: 10.2105/AJPH.2016.303349

[5] Bracci M, Ciarapica V, Zabaleta ME, Tartaglione MF, Pirozzi S, Giuliani L, Piva F, Valentino M, Ledda C, Rapisarda V, Stevens RG, Santarelli L (2019). BRCA1 and BRCA2 Gene Expression: Diurnal Variability and Influence of Shift Work; *Cancers (Basel)*;11(8); doi: 10.3390/cancers11081146.

[6] Charlton BM, Rich-Edwards JW, Colditz GA, Missmer SA, Rosner BA, Hankinson SE, Speizer FE, Michels KB (2014). Oral contraceptive use and mortality after 36 years of follow-up in the Nurses' Health Study: prospective cohort study. *BMJ*. 31;349:g6356. doi: 10.1136/bmj.g6356.

[7] Cordina-Duverger E, Menegaux F, Popa A, Rabstein S, Harth V, Pesch B, Bruning T, Fritschi L, Glass D, Heyworth JS, Erren TC, Castano-Vinyals G, Papantoniou K, Espinosa A, Kogevinas M, Grundy A, Spinelli JJ, Aronson KJ, Guenel1 P (2018). Night shift work and breast cancer: a pooled analysis of population based case-control studies with complete work history; *Eur J Epidemiol*; 33: 369-379; doi: 10.1007/s10654-018-0368-x.

[8] Costa G. (2015a). Sleep deprivation due to shift work. *Handbook of Clinical Neurology*, Vol. 131 (3rd series) Occupational Neurology M. Lotti and M.L. Bleecker, Editors. Elsevier B.V.

[9] Costa G, Haus E, Stevens R (2010a). Shiftwork and cancer: considerations on rationale, mechanisms and epidemiology; *Scand J Work Environ Health*; 36: 163-7.

[10] Costa G (2010b). Shift Work and Health: Current Problems and Preventive Actions; *Saf Health Work*; 1: 112-123; doi:10.5491/SHAW.2010.1.2.112.

[11] Costa G (2015b). Orari e turni di lavoro; *Trattato di Medicina del Lavoro*; 1253-1263, Piccin Editor.

[12] Coughlin SS, Smith SA (2015). The Impact of the Natural, Social, Built, and Policy Environments on Breast Cancer. *J Environ Health Sci*; 1(3). doi: 10.15436/2378-6841.15.020.

[13] Erren TC, Morfeld P, Groß JV, Wild U, Lewis P (2019). IARC 2019: "Night shift work" is probably carcinogenic: What about disturbed chronobiology in all walks of life?; *J Occup Med Toxicol*; 14:29; doi: 10.1186/s12995-019-0249-6.

[14] Giorgi G, Mucci N, Di Fabio A, Ariza-Montes A (2019). New professionalism and the future of work: Interdisciplinary perspectives on transformations in business-health relationships; *Front. Psychol*; doi: 10.3389/fpsyg.2019.02193.

[15] Ijaz S, Verbeek J, Seidler A, Lindbohm M-L, Ojajärvi A, Orsini N, Costa G, Neuvonen K (2013). Night-shift work and breast cancer – a systematic review and meta-analysis; *Scand J Work Environ Health*; 39(5): 431-447; doi:10.5271/sjweh.3371.

[16] IARC - International Agency for Research on Cancer (2019). Night shift work; Vol. 124; 4-11; *IARC Monogr Eval Carcinog Risk Chem Hum*; doi: 10.1016/ S1470-2045(19)30455-3.
[17] Jung HS, Lee B (2016). Factors associated with the occurrence of functional dyspepsia and insomnia in shift-working nurses; *Work*; 6; 54(1): 93-101. doi: 10.3233/WOR-162283.
[18] Kecklund G, Axelsson J; (2018). Health consequences of shift work and insufficient sleep. *BMJ*; 355:i5210. doi: 10.1136/bmj.i5210.
[19] Lecca LI, Setzu D, Del Rio A, Campagna M, Cocco P, Meloni M (2019). Indexes of cardiac autonomic profile detected with short term Holter ECG in health care shift workers: a cross sectional study; *Med Lav*; 110(6): 437-45; doi: 10.23749/mdl.v110i6.8048.
[20] Lim AJ, Huang Z, Chua SE, Kramer MS, Yong EL (2016). Sleep Duration, Exercise, Shift Work and Polycystic Ovarian Syndrome-Related Outcomes in a Healthy Population: A Cross-Sectional Study; *PLoS One*; 11(11): e0167048; doi: 10.1371/journal.pone.0167048.
[21] Liu W, Zhou Z, Dong D, Sun L, Zhang G (2018). Sex Differences in the Association between Night Shift Work and the Risk of Cancers: A Meta-Analysis of 57 Articles. *Dis Markers*; 26; 2018: 7925219. doi: 10.1155/2018/7925219.
[22] Morch LS, Skovlund CW, Hannaford PC, Iversen L (2017). Contemporary hormonal contraception and the risk of breast Cancer; *N Engl J Med*; 377(23): 2228-39; doi: 10.1056/NEJMoa1700732.
[23] Mozurkewich EL, Luke B, Avni M, Wolf F (2000). Working conditions and adverse pregnancy outcome: a meta-analysis; *Obstet Gynecol*; 95: 623-35. doi: 10.1016/s0029-7844(99)00598-0
[24] Nurminem T (1998). Shift work and reproductive health; *Scand J Work Environ Health*; 24: 28-34.
[25] Rosa D, Terzoni S, Dellafiore F, Destrebecq A (2019). Systematic review of shift work and nurses' health; *Occup Med*; 69(4): 237-243; doi: 10.1093/occmed/kqz063.
[26] Salamanca-Fernández E, Rodríguez-Barranco M, Guevara M, Ardanaz E, Olry de Labry Lima A, Sánchez MJ (2018). Night-shift work and breast and prostate cancer risk: updating the evidence from epidemiological studies; *An Sist Sanit Navar*; 41(2): 211-226. doi: 10.23938/ASSN.0307.
[27] Shi Y, Liu L, Hamada T, Nowak JA, Giannakis M, Ma Y, Song M, Nevo D, Kosumi K, Gu M, Kim SA, Morikawa T, Wu K, Sui J, Papantoniou K, Wang M, Chan AT, Fuchs CS, Meyerhardt JA, Giovannucci E, Ogino S, Schernhammer ES, Nishihara R, Zhang X (2020). Night-Shift Work Duration and Risk of Colorectal Cancer According to IRS1 and IRS2 Expression; *Cancer Epidemiol Biomarkers Prev*; 29(1):133-140; doi: 10.1158/1055-9965.EPI-19-0325.
[28] Stock D, Knight JA, Raboud J, Cotterchio M, Strohmaier S, Willett W, Eliassen AH, Rosner B, Hankinson SE, Schernhammer E (2019). *Hum Reprod*; 34(3): 539-548; doi: 10.1093/humrep/dey390.
[29] Wahidin M, Djuwita R, Adisasmita A (2018). Oral Contraceptive and Breast Cancer Risks: a Case Control Study in Six Referral Hospitals in Indonesia; *Asian Pac J Cancer*; 19(8): 2199-2203; doi: 10.22034/APJCP.2018.19.8.2199.
[30] Wegrzyn LR, Tamimi RM, Rosner BA, Brown SB, Stevens RG, Eliassen AH, Laden F, Willett WC, Hankinson SE, Schernhammer ES (2017). Rotating Night-Shift Work and the Risk of Breast Cancer in the Nurses' Health Studies; *Am J Epidemiol*; 186(5): 532-540; doi: 10.1093/aje/kwx140.